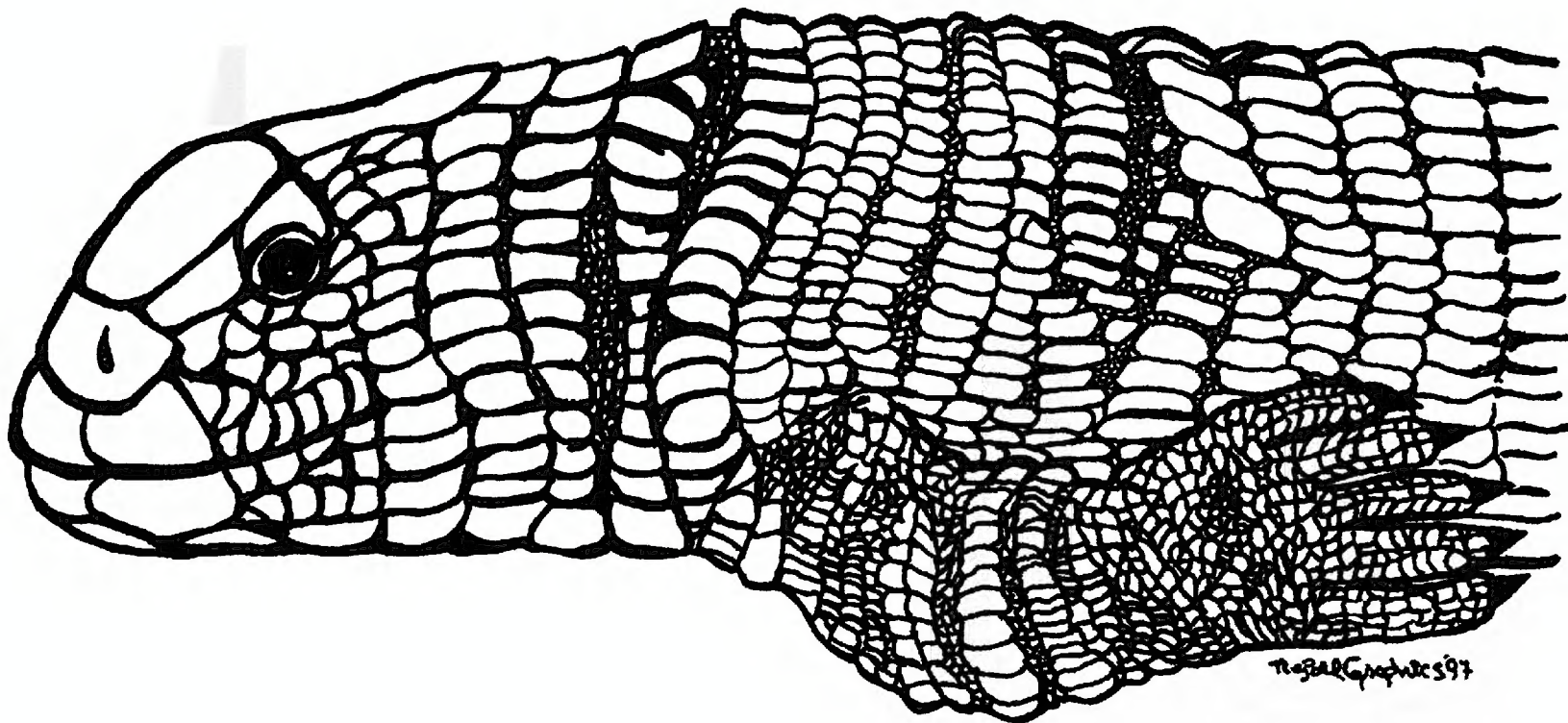

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A Logical, Systematic Analysis of a 177-year-old Herpetological Controversy: The Stephen H. Long Expedition (1820) Amphisbaenid Encounter	Gregory P. Horstman	1
A Preliminary Report on a Population of <i>Cnemidophorus sexlineatus</i> in Northwestern Illinois	Daniel A. Warner	6
A New Apparent Chromotype of the Potosí Earth Snake (<i>Geophis l. latifrontalis</i>)	Hobart M. Smith, David Chiszar and David L. Auth	8
Racers (<i>Coluber constrictor</i>) from a Quaternary Fissure near Rockton, Illinois —An Ancient Hibernaculum?	J. Alan Holman and Leslie P. Fay	9
Book Review: <i>The Reptile and Amphibian Problem Solver</i> by Robert Davies and Valerie Davies	David Blatchford	10
Book Review: <i>Amphibians and Reptiles of New Mexico</i> by William G. Degenhardt, Charles W. Painter, and Andrew H. Price	James N. Stuart	11
Currently Happening Stuff	Gary Kostka	13
HerPET-POURRI	Ellin Beltz	15
News and Announcements		17
Unofficial Minutes of the CHS Board Meeting, December 19, 1997		18
Herpetology 1998		19
Advertisements		23

Cover: Amphisbaenids of the genus *Bipes* are known to occur only in two areas of Mexico. They possess functional forelimbs; all other amphisbaenids are limbless. Drawing by Kimberly Smith.

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A Logical, Systematic Analysis of a 177-year-old Herpetological Controversy: The Stephen H. Long Expedition (1820) Amphisbaenid Encounter

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Abstract

On 27 June 1820, the Stephen H. Long Expedition, presumably in what is now northeastern Colorado, observed, collected, and documented a reptile that fit the description of an amphisbaenid of the genus *Bipes*. This event has, at times, generated considerable debate among herpetologists, since no *Bipes* has been either collected or documented in the United States by the scientific community in the ensuing 177 years. Utilizing an in-depth, logical, systematic analysis, I present the latest in a literature review on this topic and express certain opinions.

27 June 1820. South Fork Platte River, Ne-Bras-Ka Territory.

We observed in repeated instances, several individuals of a singular genus of reptiles (chirotes, Cuv.) which in form resemble short serpents, but are more closely allied to the lizards, by being furnished with two feet. They were so active that it was not without some difficulty that we succeeded in obtaining a specimen. Of this (as was our uniform custom, when any apparently new animal was presented) we immediately drew out a description. But as the specimen was unfortunately lost, and the description . . . carried off by our deserters, we are reduced to the necessity of merely indicating the probability of the existence of the chirotes lumbricoides of naturalists, within the territory of the United States. (James, 1823)

1 May 1997. University of Colorado, Boulder, Colorado.

One hundred seventy-seven years have elapsed since Edwin James, botanist and geologist for Major Stephen H. Long's expedition, described what appears to have been an amphisbaenid of the genus *Bipes*. Despite seemingly reliable anecdotal reports from southeastern Arizona (Taylor, 1938) and south Florida (Carr, 1940; p. 1) in the 1930s, northeastern Colorado in the 1940s (Maslin, 1959; p. 72), and western Nebraska in 1951 (Dundee, 1980), no *Bipes* has yet been collected or formally documented within the United States. A brief flurry of literature addressing this controversy erupted in 1980–81 (Campbell, 1980; Dundee, 1980; Gans and Papenfuss, 1980; Smith and Holland, 1981), but just as quickly subsided, and the mystery remains. What exactly happened on that day in late June, 1820, in a remote desert valley near the present-day Nebraska/Colorado border?

Utilizing a logical, systematic approach, and focusing on the main points of contention regarding James's claim, I once again resurrect this issue. With this reasoning in mind, only one of two events could have occurred on 27 June 1820. Edwin James and company either:

- A) observed, captured, and described a *Bipes*, or
- B) they did not.

Analysis of Event "A"

If Event "A" is, indeed, correct, one must carefully consider and justify the following four contentious points concerning the reported ecology and behavior of the fossorial *Bipes*, a creature that, if truly encountered by James, has eluded science for 177 years:

- 1) the sheer numbers. ("We observed, in repeated instances, several individuals . . .")
- 2) the diurnal, surface activity. (No mention was made of any nocturnal or subterranean collecting activities throughout the two-year expedition.)
- 3) the speed and elusiveness. ("They were so active, that it was not without some difficulty that we succeeded in obtaining a specimen.")
- 4) the geographic location. (The nearest known populations of *Bipes* occur over 1200 miles to the south in Baja California and western mainland Mexico.)

Discussion of Event "A" Topics

1) the sheer numbers

"One fact that has become evident in the past decade is that where they occur *Bipes* are by no means rare" (Kim et al., 1976). A total of 2645 *Bipes biporus* were easily collected at a Baja California site between 1972 and 1979 (Papenfuss, 1982), and 53 specimens of the genus *Amphisbaena* were collected in only six hours in Argentina in 1983 (Cabrera and Merlini,



Figure 1. Ne-Bras-Ka Territory. Source: Colorado Mapology. Adapted from Rufus B. Sage map (1846) with Colorado border overlay.

1990). Other investigators (Pregill, 1984; López et al., 1991; Martín et al., 1991) have likewise described little difficulty obtaining specimens, once colonies have been located.

Accordingly, suitable habitat and a plentiful food supply must be available to support these large populations. The three known species of *Bipes* occur in nearly identical sandy soil habitats (Kim et al., 1976), and the broad expanses of sand in the South Platte River Valley were well documented by James (1823). Stomach content studies have shown amphisbaenids to be generalists/opportunists, consuming small vertebrates, snails, insect larvae, termites, and ants (Pregill, 1984; Cabrera and Merlini, 1990; López et al., 1991). James (1823) remarked that a “striking feature of that part of the plain country, we were now passing, is formed by innumerable ant-heaps . . .” occurring “with some uniformity, at intervals of about twenty feet . . .”

Where amphisbaenids have invaded desert regions, they are commonly associated with the humid microhabitats of the roots of shrubs and they are seldom found far from the moist soils of intermittent watercourses (Gans, 1968; Gans, 1974; Smith and Smith, 1977; Papenfuss, 1982). The South Platte River Valley in 1820, as detailed by James (1823), mirrors this desert image.

2) the diurnal, surface activity

Amphisbaenids are commonly regarded as fossorial creatures, and most collectors (Gans and Papenfuss, 1980; H. Smith, pers. com.) have encountered scant few on the surface. However, Busack (1978) presents some evidence to support occasional diurnal, surface activity. In Spain, he found specimens of the genus *Blanus* active on the surface in April and June, and he provided circumstantial evidence indicating *Blanus* among the stomach contents of diurnal raptors (kestrels and buzzards), even in the month of July. *Rhineura*, described as completely fossorial, has also been observed being preyed upon by diurnal songbirds in Florida (Smith, 1946).

Numerous anecdotal reports exist of farmers encountering amphisbaenids after heavy rains, the creatures presumably being driven to the surface, much like earthworms, from burrow flooding (Taylor, 1938; Gans, 1971; Gans, 1974; Smith and Smith, 1977). Gil et al. (1993) correlated distinct seasonal, diurnal, surface activity patterns of *Blanus cinereus* with “heavy rains and mild temperatures.” The Long expedition, in the three weeks preceding their amphisbaenian encounter, experienced recurring “violent thunder-storms” in June, 1820 (James, 1823), at times severe enough to detain their party.

The amount of pigmentation on amphisbaenids gives a good indication of their distribution within the ground (Gans, 1968; Gans, 1974). The more highly pigmented and dorsally patterned species presumably gain a selective advantage when active at or near the surface. Gans (1969) inferred that pigmented species “may even emerge to bask upon (the surface) with some regularity.” Intrageneric differences within the current *Bipes* of Mexico vary from the uniform white of *B. biporus* to the abrupt dorsal-brown/ventral-cream change of *B.*

canaliculatus (Papenfuss, 1982). The description of James’s *Chirotres*, which may have lent further credence to his claim, was unfortunately lost.

3) the speed and elusiveness

This is, perhaps, the most compelling argument that critics use to discredit James’s sighting. Except for the following two passages, all references (and pers. com. with H. Smith) indicate amphisbaenids to be rather slow, cumbersome, easily captured creatures. Gans (1969), however, when discussing the amphisbaenian ability to create new tunnels and to travel along the surface/soil interface, stated that the “high specialization of the amphisbaenians is reflected by the speed and effectiveness with which they can carry out the (above) tasks, even in very hard soils.” Gans (1974) also referred to *Bipes*’ ability to use their short forelimbs to climb over surface irregularities and even into palm trees.

Amphisbaenids, as well as other limbless squamates and limbless vertebrates, utilize lateral undulation and concertina movement when moving along the surface, the degree of effectiveness dependent upon trunk length and flexibility (Gans, 1978). *Bipes biporus*, from Baja California, has been shown to behaviorally thermoregulate through both vertical and horizontal soil movements (Papenfuss, 1982). Might not an amphisbaenid, adapting to survive in the cooler, more northerly climate of Colorado/Nebraska, been obligated to thermoregulate closer to or on the surface with greater frequency? Might not a coincidental selective adaptation been the evolution toward a longer, more flexible torso to escape surface predation?

Some speculation exists that Edwin James, who prepared his account two years later (1822) from memory and from the assorted notes of other expedition members (R. Holland, pers. com.), and who was purportedly sick on much of the expedition, merely made a mistake in this behavioral description (Smith and Holland, 1981). Although several date/location disparities in James’s account may exist (Dundee, 1996), nowhere else does he associate any described creature with such seemingly contradictory behavior.

4) geographic location

Presently, approximately 140 species of living amphisbaenids are known, inhabiting the tropical/subtropical regions of North and South America, the West Indies, Africa, and several Mediterranean countries (Figure 2). Of this total, two genera and only four species occur in mainland North America and nowhere else: *Rhineura floridana*, restricted to peninsular Florida, and *Bipes* (three species), located in two small ranges in Mexico. However, the geographical fossil distribution of amphisbaenids in North America presents a much larger dimension (Gans, 1990).

Although fossil *Bipes* have yet to be unearthed, ancient *Rhineura*-related specimens have been documented from nearby Wyoming (Berman, 1973), South Dakota (Holman, 1979), Nebraska (Yatkola, 1976), and Colorado (Taylor, 1951). The Colorado specimens were found in Logan County, north-

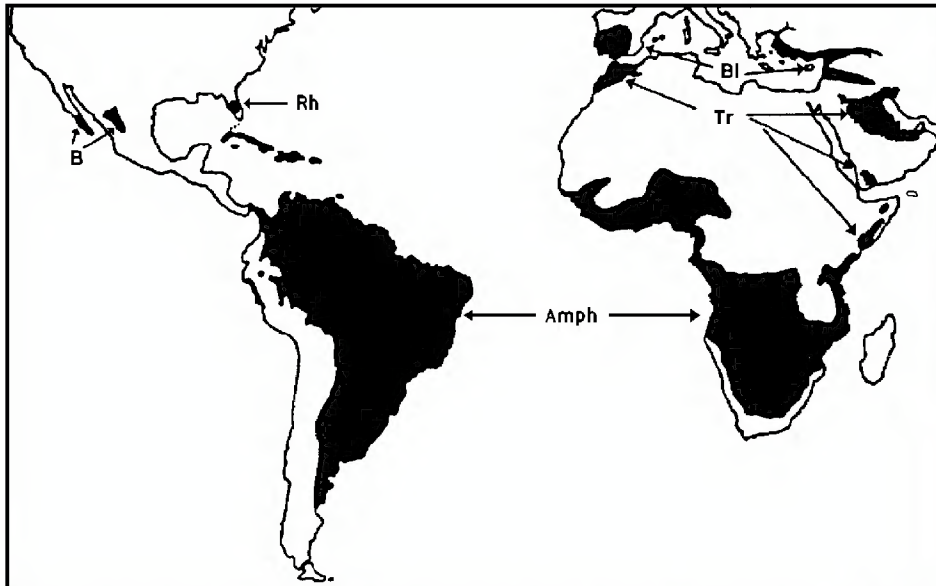


Figure 2 (Gans, 1990). Sketch map of the world showing distribution of Recent members of the Amphisbaenia. Amph, Amphisbaenidae; Bl, *Blanidae*; Tr, Trogonophidae; Rh, Rhineuridae; B, Bipedidae

eastern Colorado, within the South Platte River drainage. Interpretations of Captain J. R. Bell's diary of the Long Expedition place the party in Logan County, Colorado, on 27 June 1820 (Dundee, 1996). The Nebraska specimens were associated with numerous fish remains within braided stream sediments, suggesting a "Platte-type (emphasis mine) braided river system" (Yatkola, 1976).

Using macrochromosome counts, Gans et al. (1967) supported the relict status of both *Bipes* and *Rhineura*, and Gans (1974) later phylogenetically related both to a common ancestor. The spade-snouted *Rhineura* and the round-headed *Bipes*, although specifically adapted for burrowing patterns in unique soil/depth microhabitats (Gans, 1974), might not necessarily have always been allopatric. Today, spade-snouted and round-headed amphisbaenids are sympatric in large portions of their ranges in both South America and Africa (Figure 3).

The living *Rhineura* species exists 2000 miles from the known approximate center of its fossil distribution; the living *Bipes* 1200 miles from that same center. Until the *Bipes* fossil record indicates otherwise, there is no reason to assume that ancient *Bipes* might not have enjoyed the same favorable habitat as ancient *Rhineura*. And, if one accepts that assumption, there is no reason to assume that modern *Bipes*, equipped with its short forelimbs to facilitate burrowing in the coarser sandy soils in that region, might not have existed there in 1820, or 1997. The report of the "light-colored snakes with front feet like a mole" that were dug from the sandhills at Cassia, Florida (Carr, 1940; p. 1) may indicate a present sympatric status for *Bipes* and *Rhineura*.

During the months of May and June, 1989, Martín et al. (1991) conducted studies on the round-headed amphisbaenian *Blanus cinereus* near Torrelodones, Spain. The site was characterized by small, sandy-soiled hills separated by broad valleys containing small seasonal streams. The latitude was 40° 35' N and the elevation 960 m.

James's journal contains numerous citations of sandy ridges, broad valleys, low hills, and desert waterways in the South Platte River Valley. The approximate location of the Long Expedition on 27 June 1820 was latitude 40° 55' N at an elevation of 1000 m (Scott, 1989).

Analysis of Event "B"

If James and company did not observe, capture, and describe an amphisbaenid, one of two probable events may have occurred. They either:

- 1) misidentified a similar looking reptile, or
- 2) fabricated the event.

Discussion of Event "B" Topics

1) misidentification

Thomas Say, the zoologist for the Long Expedition, was known to have collaborated with Edwin James in preparing the final report, although his name does not appear as co-author (Campbell, 1980). A competent, meticulous naturalist, Say was primarily a taxonomist, and remains the original describer of nine reptiles and one toad collected on this expedition (Campbell, 1980). This, in itself, is a remarkable feat that should leave his reputation beyond reproach. Additionally, Say not only assigned to this creature the specific genus "*Chirotes*. Cuv.," the old amphisbaenian name coined by Cuvier in 1817, but specifically described it as a two-legged lizard. Obviously, Thomas Say was a conscientious and well informed herpetologist, one who kept abreast of the latest formal literature on the topic, as difficult as that must have been in 1820.

For those readers who might harbor the notion that Say confused a *Bipes* with a *Eumeces*, a common local skink, I

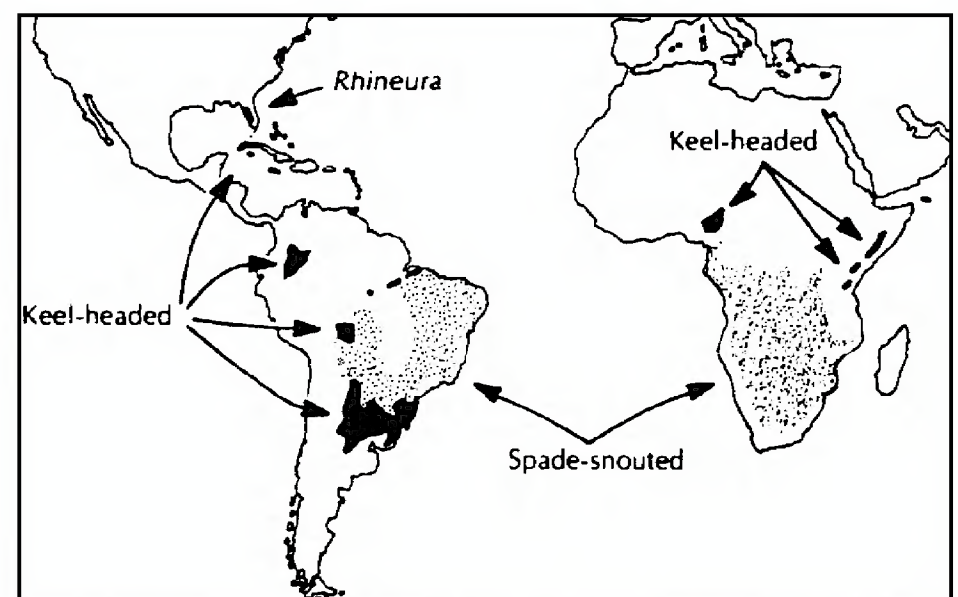
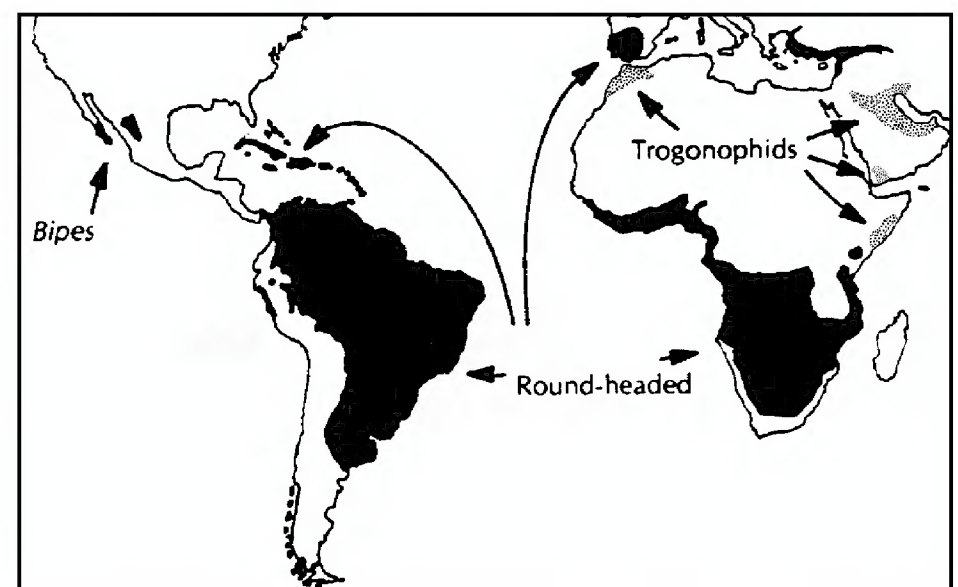


Figure 3 (Gans, 1974). Sketch maps to show the distribution of the different subgroups of amphisbaenians.

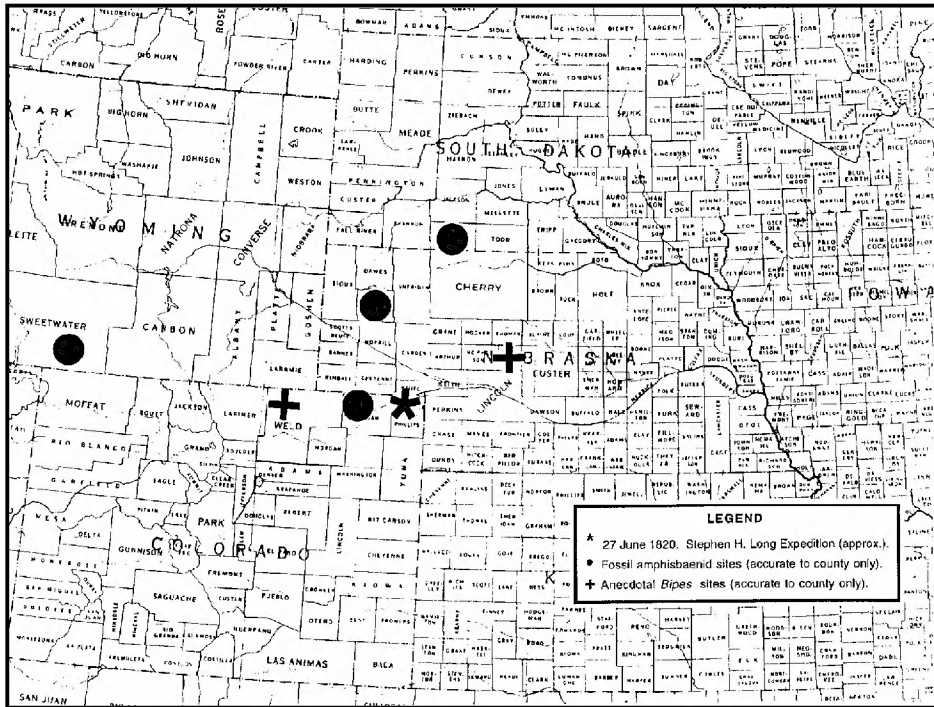


Figure 4. Amphisbaenian-related sites referred to in the text.

would invite you to examine a *Bipes* specimen at the nearest repository and place it in your hand. I have held several in hand (UCM #29252, #29255, #35751) and discussed this particular aspect with professionals who have collected live *Bipes* (H. Smith, R. Holland, pers. com.). The possibility of misidentification by a rank amateur, let alone a professional zoologist, is virtually nonexistent. There is simply no other creature of its kind in existence.

2) fabrication

The very idea of a hoax might seem absurd, but science has had its share, so the issue must be addressed. The most pertinent question to ask would be “Why?” What possible gain would Thomas Say and Edwin James have had in perpetrating a hoax, especially the mere documentation of the presence of a creature that had *already* been described several years earlier? Would not a more worthy subject for a hoax have been the “discovery” of one of the nine species or subspecies of herpetiles that they documented that had *not* previously been de-

scribed? (All nine, of course, have ultimately been verified.) It is inconceivable that both men would risk their reputations on such an insignificant issue.

Interestingly, the *Chiotes* observation did not even merit its own paragraph in James’s report. Instead, it comes in the middle of a paragraph that describes several “barren desert plants,” one (*asperfoliae*) “of a genus not heretofore known in the United States” (James, 1823). James’s recall of the *Chiotes* encounter deviates in no discernible manner from the style he employed throughout his manuscript. Nowhere does he exclaim, “Look what we found!” or suggest to the reader anything other than “business as usual.” If this was contrived, Mr. James was the ultimate “con” man.

Furthermore, if this was a fabrication, James and company unbelievably “lucked out” by choosing the most probable location in the United States to document the existence of this creature. Surrounded by subsequent archaeological amphisbaenian discoveries and seemingly accurate anecdotal reports (Figure 4), this South Platte River site, especially when associated with the excellent amphisbaenian habitat requirements as described by James in 1820, could not have been more ideal. Edwin James could appropriately be titled the “Rasputin of Herpetology” if he randomly chose this site, from the thousands encountered on his journey, to perpetrate such a hoax.

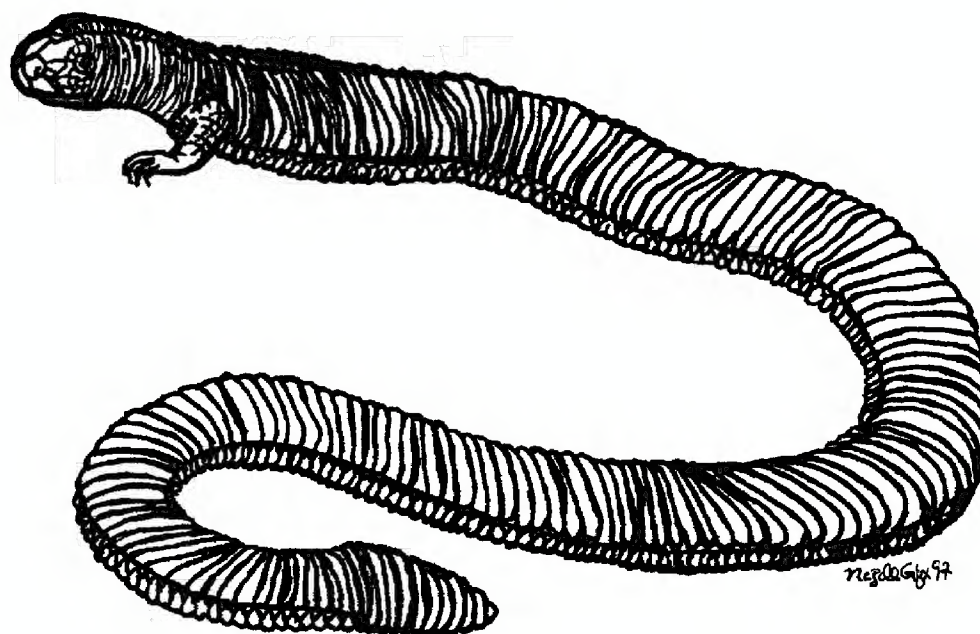
Summation

The arguments herein presented support the hypothesis that a reasonable person cannot summarily dismiss the notion that Edwin James and company did, indeed, observe, capture, and describe an amphisbaenid of the genus *Bipes* near the Colorado/Nebraska border in June 1820. However, until the creature is actually in hand, I, like Edwin James 177 years ago, am still “. . . reduced to the necessity of merely indicating the probability . . .” that *Bipes* did once, and may still, exist within the continental United States.

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A Preliminary Report on a Population of *Cnemidophorus sexlineatus* in Northwestern Illinois

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Introduction

The six-lined racerunner, *Cnemidophorus sexlineatus*, has a very widespread distribution throughout the United States (Conant and Collins 1991). In Illinois, *C. sexlineatus* is mainly confined to habitat along the Mississippi and Illinois Rivers (Smith 1961). The populations along these rivers are not continuous; instead there are many allopatric populations which have become isolated due mainly to habitat destruction causing gaps of unsuitable habitat. Throughout its range, *C. sexlineatus* occurs in a variety of habitats (Fitch 1958), but in Illinois this species appears to be restricted mainly to dry hill prairies and is most abundant in sand prairies (Smith 1961).

Southern populations of *C. sexlineatus* have been studied (Fitch 1958, Carpenter 1959, Bellis 1964, Walker 1964, Clark 1976), however, little is known about northern populations, especially in Illinois. The purpose of this study is to learn about the status and structure of a northern *C. sexlineatus* (Figure 1) population in Whiteside County, Illinois. This particular population is of special interest because it is small and isolated. This small isolated population probably has very little, if any, migration of new lizards into it and therefore it may have a greater risk of extinction and an increased chance of inbreeding. Consequently, estimating population size and population density will give important insight into the stability and structure of this population. I am currently using molecular techniques to look at the genetic variation within this population and in relation to another Illinois population.

Materials and Methods

The field site, a 0.465 km² segment of National Wildlife Refuge land, is located at the Thomson-Fulton Sand Prairie in Whiteside County, Illinois (Figure 2). The Thomson-Fulton Sand Prairie has very dry sandy soils, and the dominant vegetation includes *Stypa* sp., *Opuntia humifusa*, patches of *Rhus*

aromatica, and various members of the Fabaceae.

Field work was conducted every morning from 1 June through 2 July 1997. Lizards were initially captured by hand. Drift fences with pit traps were assembled on 21 June, which improved the efficiency of capturing these quick lizards. Four drift fence arrays were set up along the west side of the sand prairie. Because drift fences were only on the west side, there was unequal capture rates throughout the entire prairie, with a positive bias toward the western side. The drift fences were checked twice a day, once in the morning and once in the evening.

After capture, individuals were taken back to camp to be processed. Snout-vent length (SVL) measurements were taken to the nearest millimeter, mass was taken with Pesola® spring scales to the nearest gram, and individuals were sexed by examining secondary sexual characteristics (juveniles were not sexable). Males differ from females in having more prominent femoral pores, a broader tail base at the cloaca, and a frequent pale blue wash ventrally (Smith 1961). Hemipenes were everted, if possible, to determine the sex of some individual males. Lizards were marked with unique toe clip combinations, so they could be individually identified (Figure 3). Toe clips were retained in liquid nitrogen for future genetic studies. Lizards were returned to their location of capture the following day and released.

Transect surveys were conducted on 28 and 29 June to estimate population density (Figure 4). Transects were run at 10 m intervals covering an area of approximately 0.30 km². Lizards sighted were recorded and the perpendicular distance that each lizard was seen from the transect line was estimated to the nearest m. The equation used for estimating population density was $D = n/2La$, where n = number of lizards sighted, L = length of the transect, and a = greatest distance that a lizard was sighted from the transect (Krebs, 1989).



Figure 1. *Cnemidophorus sexlineatus* from the Thomson-Fulton Sand Prairie, Whiteside County, Illinois. Photograph by D. Weisrock.



Figure 2. *Cnemidophorus sexlineatus* habitat at the Thomson-Fulton Sand Prairie, Whiteside County, Illinois. Photograph by the author.



Figure 3. Lizards were marked with unique toe clip combinations. Toe clips were retained for genetic studies. Photograph by D. Weisrock.

Because of the small sample size and number of recaptures obtained during this survey, it was difficult to estimate an approximate population size using traditional population size estimation methods. Instead, I used a Bayesian method (Gazey and Staley, 1986) because it works well for all cases regardless of sample size in that the end product describes the uncertainty of the population size given the data.

Results and Discussion

During the field study, 36 *Cnemidophorus sexlineatus* were captured, marked, and released. There were only six recaptures throughout the 32-d sampling period. Despite these small numbers, juveniles, adults, and even gravid females all were captured, suggesting that the Thomson-Fulton Sand Prairie population may be stable. Indeed, of the lizards captured, 36% were female ($N = 13$), 50% were male ($N = 18$), and 14% were unsexable juveniles ($N = 5$).

SVL and mass were positively correlated ($r = 0.845$, $P < 0.0001$). Fitch (1958) showed that mean SVL of males and females are approximately the same, and small differences were not statistically significant. The same was true for this population, however, on average females weighed more than males (mean male SVL = 62.00 mm, female SVL = 62.54 mm; mean male mass = 6.67 g, female mass = 7.31 g). The juveniles captured had a SVL that ranged between 32 and 44 mm and the adults had a SVL range of 56 to 72 mm. Fitch (1958) showed that intermediate sizes of *C. sexlineatus* are not represented during the early summer months and that juveniles captured during this time are hatchlings from the previous year that will be adults by the end of the summer. The results of this study appeared to be consistent with Fitch's findings because lizards in the size class between 44 and 56 mm SVL were not captured.

The Bayesian method showed that the most probable population size was approximately 90 individuals, although the



Figure 4. Transect surveys were conducted to estimate population density. Photograph by the author.

probability was only 0.011. With 95% confidence, the population was in the range of 66 to 222 individuals. I expect that the actual population size exceeds the predicted range because of the large number of lizards that I observed but was unable to capture. However, the majority of the captures were on the west side of the sand prairie and this estimation may accurately reflect the population size in this particular area, and not in the entire prairie.

Data from the transect surveys showed that population density in June was approximately 333 lizards/km². The west side of the sand prairie, the most heavily sampled area, is approximately 0.30 km². In an area of this size then, there would be approximately 100 lizards. This estimation may be accurate because it is in the 95% confidence interval range of the Bayesian population estimation.

The small amount of data obtained in this study is not yet extensive enough to approximate growth rates, sex ratio, and home range for *C. sexlineatus*. However, future work will give a more accurate estimation of the size and structure of this northern population. Currently, molecular work is also being conducted to gain insight into the degree of inbreeding and genetic variation within this population and between another isolated population located in Madison County, Illinois.

Acknowledgments

This project was supported by an ISU Department of Zoology and Genetics Summer Internship and by the Chicago Herpetological Society. I would like to thank Dr. Fredric Janzen for his help and direction, Nirvana Filoramo, Luke Harmon, Jason Kolbe, Carrie Milne, Nick Notis, and Dave Weisrock for their suggestions and assistance in the field, and Dr. Hal Stern for helping me with the population estimations. John Tucker helped obtain *C. sexlineatus* tissue from the Madison County population and Tamara Haselkorn is currently helping with the molecular work on this population.

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A New Apparent Chromotype of the Potosí Earth Snake (*Geophis l. latifrontalis*)

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A uniquely patterned specimen (UF 87973) of *Geophis l. latifrontalis* was taken by Fred G. Thompson 25 July 1993 one km ENE Pinal de Amoles, 2140 m, Querétaro, Mexico. It is a subadult male, 173 mm total length, 25 mm tail length, with 159 ventrals, 38 subcaudals, and normal (Downs, 1967: 102-3) scalation for the subspecies. It differs considerably in pattern, however, from the material reported by Downs and subsequently by Dixon and Thomas (1974: 272) including, among the latter, eight specimens also from the vicinity of Pinal de Amoles.

In the UF specimen, the entire ventral surface of both body and tail is white, unmarked, and the lateral edges of the dorsal scales are light, resulting in the appearance of a dark median line lengthwise on each scale row. In other specimens, as

described by Downs and confirmed by Dixon and Thomas, the dorsum is uniformly dark, the subcaudal surface highly pigmented, and the venter often dark at least posteriorly and throughout in some.

Inasmuch as several typical *G. l. latifrontalis* have been taken in the same area as the striped specimen, the latter, in the absence of differences in scalation, presumably represents a variant of the same species. Further material will be required to confirm or modify this conclusion. The species is already known (Dixon and Thomas, 1974) to be highly variable in pattern, although the cross-banded pattern characteristic of *G. l. semiannulatus* is parapatric with the dorsally unicolor black pattern of *G. l. latifrontalis*. The striped pattern here reported, however, does not appear to be geographically segregated.

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Racers (*Coluber constrictor*) from a Quaternary Fissure near Rockton, Illinois — An Ancient Hibernaculum?

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In July and August 1993 Dave Corner collected hundreds of small bones from a fissure fill in bluffs of the Pecatonica River in the Macktown Forest Preserve near Rockton, Winnebago County, Illinois. All of these bones represent the racer, *Coluber constrictor*, with the exception of a single short-tailed shrew (*Blarina brevicauda*) lower jaw identified by L. P. Fay. We suggest that the fissure may represent an ancient *Coluber constrictor* hibernaculum.

The fossils came from material in a side pocket at the contact between the Ordovician Plattville and Galena formations in a large vertical fissure that extended downward into the Plattville formation. The fossils were in a porous, calcitic flowstone. Such fissures (Figure 1) are common in the area and additional vertebrate fossils may be found at other similar localities.

Mr. Corner collected about 750 g of the fossiliferous material and etched the fossils from it with a 5% solution of acetic acid. The remains were donated to the Vertebrate Paleontology Section of the Geology Department of the Field Museum in November of 1993 and the material was sent to J. A. Holman for identification in 1995. We have been unable to obtain a radiometric date on the fossil deposit, thus the exact age of the

fossils is unknown. We suggest that the fossils could be from a few hundred to several thousand years old based on the extent of permineralization and fragility of the bone.

The Racer Bones

All of the *Coluber constrictor* bones are recorded under Field Museum of Natural History Vertebrate Paleontology Number PR 1987. **Skull bones** include 2 parietals, 1 right quadrate, 1 basioccipital, 3 basiparasphenoids, 1 left and 1 right maxillae, 2 left palatines, 1 right pterygoid, 4 left and 3 right mandibular compound bones, 1 left and 2 right dentaries, and several tooth-bearing fragments. **Postcranial bones** include 410 trunk vertebrae and 107 cervical and caudal vertebrae. **Miscellaneous bones** include: about 250 ribs and fragments. Auffenberg (1963) has discussed the identification of fossil *Coluber constrictor* on the basis of individual bones.

Remarks

A minimum number of at least four individual snakes are represented based on four 4 left mandibular compound bones. Comparisons of the fossils with skeletons of modern *Coluber constrictor* indicate individuals ranging from about three to three and one-half feet (about 91 to 107 cm) are represented in the assemblage. The single short-tailed shrew (*Blarina brevicauda*) lower jaw may represent prey ingested by one of the racers as Ernst and Barbour (1989 p. 61) report that *Blarina* is one of the food items of *Coluber constrictor*.

Assemblages of fossil snakes found in fissures and caves usually include several species, as they usually enter the cave in the form as pellets cast by barn owls (see Holman, 1995). Thus the presence of a single species of snake represented by literally hundreds of individual bones is very unusual. We suggest that the Rockton fissure was used as a hibernaculum by the racers. Ernst and Barbour (1989 p. 58) report that caves and rock crevices are among the kinds of hibernacula utilized by *Coluber constrictor*.

Presently, the racer subspecies that occurs in Winnebago County, Illinois, is the blue racer, *Coluber constrictor foxii* (Conant and Collins, 1991, Map 157). The occurrence of *C. constrictor foxii* in Winnebago County is documented by specimens in the Illinois Natural History Survey from the Kishwaukee Forest Preserve, Rockton, and from 7 miles NW of Shirland (Olson, 1956). Olson also reported that "several other racers have been seen in the Shirland area."

Acknowledgments

We thank J. J. Flynn and R. Masek of the Field Museum for the opportunity to study the Rockton fossils. L. P. Fay took the photograph for Figure 1.



Figure 1. Typical fissure fill site in the Pecatonica River bluffs in the Macktown Forest Preserve near Rockton, Winnebago County, Illinois. These sites could produce more vertebrate fossils in the future.

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**Book Review: *The Reptile and Amphibian Problem Solver* by Robert Davies and Valerie Davies
Hardbound. 208 pp., over 150 color plates. Tetra Press. ISBN 1-56465-194-0**

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Despite having to labor under a somewhat ponderous title this is quite simply the best book aimed at beginners that I have ever seen.

The authors, well known and respected experts particularly in the fields of dendrobatid and chameleon care, have shoe-horned into a relatively slim volume of just over 200 pages enough information to equip anyone to keep a wide range of reptiles and amphibians. They have selected, with a few exceptions, animals which are frequently available in the "animal trade" both in pet stores, and let's be honest this is the point of entry for the vast majority of newcomers to the interest, and from specialist breeders and, after a brief introduction, give general and specific (in tabular form) data on a selected range of over 100 species.

The book is not arranged in chapters but in sections which are simply listed as: starting out, reptile care, reptile species, amphibian care, amphibian species, herptiles and the law (the book is aimed at readers on both sides of the Atlantic so the information here is neither specific (e.g., local ordinances) or all encompassing. There then follows a glossary, further reading and a list of useful addresses. The book also has an index, which is probably readable with strong glasses.

Each section is subdivided into species descriptions to which there is a directory. The list of accounts may initially

appear slightly arbitrary but is a reflection of the authors' interests tempered by commercial availability and each is preceded by a family account, then followed by notes on selected species. The data can be quite brief or cover several pages but are summarized in detailed tables. This layout is difficult to describe but very effective, and the information is sufficiently detailed and well researched to allow anyone to succeed with these animals.

The book is beautifully illustrated with a color plate on almost every page; many of these pictures are of the highest quality.

There are a few inconsequential publishing errors; reversed or incorrect legends in a couple of plates and some flaws in pagination. The only puzzling aspect is the title; this refers to small lists of questions and answers, each flagged with a colorful symbol, that pop up from time to time throughout the text. Sometimes this offers the opportunity to insert a specific note but very often it simply duplicates information proffered elsewhere. This looks suspiciously like a marketing person's pet idea and frankly strikes a slightly jarring note in a quite superb book.

I have not the slightest doubt that this will be the market leader and the authors and publishers, deserve every congratulation for producing an excellent text in a neat package.

Book Review: *Amphibians and Reptiles of New Mexico*

by William G. Degenhardt, Charles W. Painter, and Andrew H. Price. 1996. xix + 431 pp. University of New Mexico Press, Albuquerque. ISBN 0-8263-1695-6. Clothbound. \$35.

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For students of herpetology, the American Southwest is one of the most fascinating areas in North America and yet good field guides and reference books on the amphibians and reptiles of this region have been few and far between. *Amphibians and Reptiles of New Mexico* is the most recent addition to the growing list of state guides and represents an important contribution to the herpetology of the United States by partially filling a major geographic “hole” in the available literature. Although comprehensive herpetofaunal guides have been published for the adjacent states of Colorado (Hammerson, 1982), Oklahoma (Webb, 1970), and Texas (Dixon, 1987), this is the first such book to include a large part of the desert Southwest.

The book is not a pocket guide and you probably won't want to take it backpacking. It is a large (26 × 20.5 cm) volume that includes many features that we have come to expect from books on state herpetofaunas. At first glance it may appear to be written solely for the professional biologist, but most of the text is not too technical for the layman who may want to learn about the natural history of New Mexico species or simply identify a snake he has encountered. Each of the 123 species accounts includes subsections entitled Type (specimen and locality), Distribution, Description, Similar Species, Systematics, Habitat, Behavior, Reproduction, Food Habits, and Remarks. A detailed range map follows each account. There are dichotomous identification keys for tadpoles and salamander larvae (prepared by Ronn Altig), salamanders, toads and frogs, turtles, lizards, and snakes. And there are plenty of beautiful, full-color photographic plates of species and habitats in the state.

Many herpetofaunal guides for the eastern and central United States effectively use county records as a device for mapping species distributions, but New Mexico, like most states west of the 100th meridian, is a big state with relatively few counties. This meant extra work for the authors since actual localities of occurrence had to be plotted on maps instead of the “one dot per county” method used in similar books (e.g., Dixon, 1987). Degenhardt et al. are to be commended for the laborious job of compiling the locality data and constructing the 123 range maps in this book. Their efforts included a review of specimen records and examination of specimens from 75 public and private research collections (the names of more than a hundred curators and curatorial assistants who provided museum records and loans are listed in the Acknowledgments). I found few plotted localities that are in error or are questionable. On the *Chelydra serpentina* map, the locality dot in Valencia County should instead have been

placed in northern Socorro County (La Joya State Waterfowl Area). On the *Trachemys gaigeae* map, the dot in northern Socorro County (also at La Joya) is not based on a voucher specimen and, in my opinion, should have been accompanied by a question mark or discussed in the text, as were some unverified records for other species. I would have preferred that the authors identify those localities based on unvouchered reports with a different symbol (e.g., an open circle), but this is a minor complaint given the scope of this work.

Editorial mistakes are a common problem with many new books, but the authors have saved reviewers and readers a lot of effort by identifying themselves many of the errors in this first edition. Shortly after *Amphibians and Reptiles of New Mexico* appeared in print, Price et al. (1996) published a list of corrections for the most important errors. Although I will not repeat their corrigenda here, I urge all owners of the book to obtain a copy of the article from *Herpetological Review* or from one of the authors. A few of the errors are significant enough to affect the usefulness of the guide. One correction not in the corrigenda: the *Cnemidophorus exsanguis* in Plate 62 is from Bernalillo (not Hidalgo) County; it is the same specimen illustrated in Stuart (1991).

Other than the errors identified in the corrigenda, there are few significant oversights. The glossary is notably deficient in that it lacks a number of technical terms, abbreviations, or obscure words used in the text, including: azygous, axillary, conspecific, cryptic, dimorphic, DOR, imbricate, medially, ophiophagy, ostium, paraphyletic, paravertebral, phenology, proteroglyphous, *sensu lato*, *tinaja*, and ventrolateral. Snout-vent length (SVL) is not defined for anurans; the alternative for frogs and toads, snout-urostyle length (SUL), is not used in the book. Although many of the unlisted terms can be found in a good biological dictionary, others such as “DOR” (dead on road) and *sensu lato* (L., in the broad sense, as in a taxon) may cause confusion, even for some biologists. “*Tinaja*” (p. 118), a term sometimes applied to a natural rainwater catchment in an unbroken rocky area, is rarely used even in the Southwest.

The Literature Cited section is extensive—about 1,600 titles by my count—and includes most pertinent journal articles, books, and contract reports up to and including 1994, plus a few references from 1995. The authors worked tirelessly to compile this huge list and I have no doubt that this section will be an invaluable resource for all students of Southwestern herpetology. After more than a year of use, I have detected a few significant omissions (e.g., Best and Polechla, 1983; Tanner, 1988) but, in general, the section covers quite thor-

oughly the literature applicable to New Mexico.

The scientific names used in the book are conservative for the most part. The authors prudently (in my opinion) did not include many of the new taxonomic combinations which have emerged in recent years and have yet to gain wide acceptance. There are exceptions, however, such as their use of *Liochlorophis vernalis* for *Opheodrys vernalis*, and *Cnemidophorus grahamii* for diploid populations of *C. tessellatus*. I compared the state checklist of 166 subspecies and monotypic species provided by Degenhardt et al. (pp. 11–14) to the recent North American checklist by Collins (1997) and found about 37 differences in binomial and trinomial combinations. The updated checklist by Collins was unavailable at the time this book was written, but includes a number of changes which affect the New Mexico state list such as: 1) the elevation of some apparently allopatric subspecies to species (e.g., *Cnemidophorus inornatus gypsi* to *C. gypsi*), 2) the subdivision of certain polytypic species (e.g., placement of western races of *Ambystoma tigrinum* into *A. mavortium*), and 3) the elimination of many subspecies (e.g., four New Mexico races of *Urosaurus ornatus* are omitted). Many of these new combinations may survive long enough to be incorporated in a second edition of *Amphibians and Reptiles of New Mexico*, but at present the book's taxonomy is mostly concordant with that of similar references for adjacent states.

My favorite part of state herpetofaunal guides is the natural history information provided for each species. The authors have gleaned much of this information from the literature,

their own field notes, and the observations of others. Although some observations are from populations outside of the state, data from New Mexico populations were provided whenever available. Since comprehensive natural history studies are still lacking for many amphibian and reptile species, much of the information presented on reproduction, behavior, food habits, etc. is based on one or a few observations. Within the recitation of facts, the reader will find occasional touches of levity, such as a comment by Degenhardt on his 50-year-old bite scars inflicted by an aggressive (i.e., typical) *Coluber constrictor* (pg. 265), or a deadpan reference to the absence of warthogs in the diet of *Tantilla yaquia* (pp. 311–312). Scientific writings do not have to be totally humorless, after all.

One revelation provided to me by this book was how much we do *not* know about amphibians and reptiles in New Mexico. Throughout, the authors have identified gaps in our knowledge about the distribution, natural history, and status of New Mexico populations. A chapter on species of questionable occurrence pinpoints areas of the state where surveys are needed. Few publications in science are the “last word” on a subject. Although this book is an important benchmark, my expectation is that it will also be a stimulus for further research on Southwestern amphibians and reptiles. In summary, I highly recommend *Amphibians and Reptiles of New Mexico* to anyone with an interest in the herpetofauna of North America. For the student, amateur, or professional herpetologist who lives or works in the southwestern United States or adjacent Mexico, the book will be an indispensable part of his reference library.

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Currently Happening Stuff

reported by Gary Kostka

The Bigger They Are, The Harder They Squeeze . . .

If you're a fan of giant snakes, (and who the heck isn't?) then you surely would have enjoyed the November 26 general meeting of the Chicago Herpetological Society. John Murphy was the evening's featured speaker. He gave us a sampling of some of the fascinating information contained in the pages of *Tales of Giant Snakes: A Historical Natural History of Anacondas and Pythons*, a book co-written by Murphy and fellow herpetologist Robert Henderson. The book was available for purchase in the lobby prior to the meeting, and those who wished to could have their copy signed by both authors. Murphy, a CHS member, is an Associate with the Division of Amphibians and Reptiles at the Field Museum, and a Biology teacher at Plainfield High School in Plainfield, Illinois. Henderson is the Curator of Herpetology at the Milwaukee Public Museum. Both men are well respected in the field of herpetology, and have written numerous books and articles on a variety of herp-related topics.

John began his presentation by enumerating the four species of snake classified as giants because of their potential to attain lengths of 20 feet or more. They are the anaconda, the Indian python, the reticulated python and the African python. He went on to discuss the geographic distribution and natural history of these species, as well as relating a number of historical accounts of various individuals encounters with each. Some of these reports involved snakes of extraordinary lengths, but were unconfirmed and therefore discounted by John as probably being exaggerated or mistaken estimates of size. Mention was also made of the four species of Indo-Australian pythons which have been credited with attaining lengths approaching 20 feet. They are the amethystine, western olive, and Oenpelli pythons of Australia, and the Papuan python of New Guinea.

The largest snake to be irrefutably documented was a reticulated python named Colossus, formerly owned and exhibited by the Highland Park Zoo outside of Pittsburgh. Colossus measured 28½ feet and weighed approximately 300 pounds at the time of her death in 1966. The Guinness Book of World Records lists the longest snake on record as a 33-foot retic reported to have been measured after it was killed by a mining engineer in Celebes (Sulawesi), Indonesia, in 1912. This record is based solely on hearsay evidence, and therefore cannot be considered to be absolutely reliable.

According to John, stories concerning the size of giant snakes are rivaled only by those regarding their feeding habits and selection of prey. They consume almost every type of vertebrate prey including mammals, birds, reptiles, amphibians and fish. As we viewed a slide showing an African python constricting a Nile crocodile, John noted that most

species of giant snakes are known to prey upon crocodilians. He found this somewhat surprising in that crocodilians are typically large and powerful animals with tough bony hides, making them both a dangerous prey item to subdue and a difficult meal to digest. Although he could find no

record of a reticulated python eating crocodilian prey, John mentioned that he had heard from a herp enthusiast whose pet retic had constricted and consumed one of his pet caimans. "So even reticulated pythons eat crocodilians . . . at least in captivity," noted John with a wry grin.

We were treated to a number of slides of various giant snakes which had consumed, or were attempting to consume prey items of enormous size in comparison to their own body mass. There was a graphic shot of an anaconda next to a white-tailed deer that it had just regurgitated. John did not specify whether the snake had regurgitated the deer because it was too large, or in response to the stress of being captured. At any rate, it was amazing that the anaconda was able to engulf a meal of such prodigious proportion in the first place. "Every time I look at this picture it hurts!" was John's comment as he showed a slide of an amethystine python with its belly grotesquely distended by a wallaby which it had just eaten. There was an audible gasp in the room as we were shown a slide of an African python straining to swallow a 43-kilogram calf. The snake's jaws were separated to such a degree as to render its head almost unrecognizable. John remarked, "Snakes don't seem to have a real good ability to judge how large a prey item is. If something smells right they attack it, even though it may be totally inappropriate in size."

John made mention of the fact that there are numerous accounts in the literature of giant snakes attacking, and sometimes consuming humans, but these are extremely rare occurrences. While gathering information for the book, he came across a story published in the Malayan Straits Times documenting the untimely demise of a Malaysian rubber tapper who was killed and ingested by a large reticulated python. The article had been accompanied by a picture of the snake, but John had only been able to obtain a photocopy of the picture and was unable to include it in his presentation.

The final topic of the evening concerned the question of conservation of giant snakes, and whether it is necessary considering the fact that most of these species are now being captive-bred in significant numbers. Unfortunately, throughout history encounters between humans and giant snakes in the wild have usually resulted in the death of the snakes. They are killed for a variety of reasons including use as a food source, commercial value of their skins, or simply because they are feared and loathed. John expressed his

alarm at the number of giant snakes that are being harvested in the wild. He cited figures from a set of data published by CITES (Convention on International Trade in Endangered Species), detailing the numbers of snakes of the four giant snake species that were taken from the wild during the period from 1980 through 1986. During that time, 170,000 anacondas, 855,000 Indian pythons, 2,300,000 reticulated pythons, and 29,000 African pythons were taken from the wild. The majority of these snakes were taken for their skins—the number captured for the pet trade being insignificant in comparison. Considering the age of the data in this study, one can only wonder what the current figures might be.

In closing, John posed the question as to how long these populations of giant snakes could withstand this kind of pressure. Are there great enough numbers of them to sustain their existence in the wild? In the course of gathering information for *Tales of Giant Snakes*, both John Murphy and Robert Henderson questioned herpetologists about their encounters with giant snakes in the field. Most responded that they were no longer seeing them in any appreciable numbers. What a travesty that these magnificent serpents so often seen in captive collections should become so scarce in the wild.

Thanks to John Murphy and Robert Henderson for sharing their time and expertise.

Democracy in Action . . .

Election of the 1998 CHS Officers and Members-at-Large of the Board of Directors took place during the business portion of November's meeting. Gino Martinez, Chairperson of this year's Nominating Committee stepped up to the podium and solicited nominations from the floor for the offices of President through Sergeant-at-Arms, but none were forthcoming. Since the candidates for the eight officer's positions ran unopposed, each was elected by acclamation as their names were called. Officers of the CHS Board for 1998 are: Steve Spitzer, President; Jack Schoenfelder, Vice President; Gary Fogel, Treasurer; Jenny Picciola, Recording Secretary; Mike Dloogatch, Publications Secretary; Gino Martinez, Membership Secretary; Lori King-Nava, Corresponding Secretary; and Ron Humbert, Sergeant-at-Arms.

Ballots were then cast for the six candidates who sought the four available Member-at-Large positions. After the arduous task of counting the ballots was completed, the results were announced to the eagerly awaiting assemblage. The 1998 Members-at-Large are Karen Bielski, John Driscoll, Audrey Vanderlinden and Jenny Vollman.

Thanks to the 1997 Board members for their hard work and dedication to the cause. Best of luck to the newly elected members of the 1998 Board.

Honorable Mention . . .

November's meeting also provided an occasion for honoring those members who had distinguished themselves through their extraordinary contributions to the CHS throughout the past year. Ron Humbert, Chairperson of the Awards Committee presented Lori King-Nava with the Board Merit

Award, citing the superb job she did as Chairperson and chief organizer of Reptilefest 1997. Steve Spitzer then took the podium for the presentation of the President's Service Award. "She's someone I can count on to do a job without my having to ask her." said Steve as he called Jenny Vollman up to receive her plaque. Jenny serves as the CHS Shows Coordinator, and also oversees the operation of the retail book service. Congratulations to both Lori and Jenny. Their tireless efforts on behalf of the CHS should serve as an inspiration to all.

Spring Fever's Setting in . . .

It may be midwinter in Chicago, but thoughts of spring have already invaded the heads of at least two CHS members. Reptilefest '98 is on the horizon, and Lori King-Nava and Gary Fogel will be co-chairing this year's event. Scheduled for the weekend of May 2-3, 'Fest '98 will be held at Northwestern University in Chicago. It's up to each of us to do all that we possibly can to promote this show, as this is the first time that Reptilefest will be held at this venue. You might note that this year's 'Fest is not being held during the Memorial Day weekend as it has in years past. This change of dates was made in an attempt to avoid direct competition with the numerous other activities available to the public during the holiday weekend. Hopefully this change of dates will translate into larger attendance figures. Moving Reptilefest off of the holiday weekend should also enable more CHS members to participate in the event on both days, as their chances of having conflicting commitments will be lessened.

Your herps may be hibernating, but that doesn't mean that you have to. Shake off the winter doldrums and get involved in the 1998 Reptilefest Planning Committee. The only qualification required for joining is a desire to help the CHS. Benefits include good times, great camaraderie, and a profound sense of accomplishment after pulling the whole thing off. Interested individuals should contact either Lori King-Nava at (773) 477-3645, or Gary Fogel at (773) 935-6938.

Meet Me in St. Louis . . .

Member-at-Large Audrey Vanderlinden has announced her intent to mastermind a CHS field trip to the St. Louis Zoo. She's currently in the process of seeking out a charter bus service to provide transportation there and back. The trip is tentatively scheduled for the second or third Sunday in June. Stay tuned to this column for further details as they become available.

Thanks for your indulgence. See you next month.

HerPET-POURRI

by Ellin Beltz

Happy New Year! To all readers from your loyal scrivener. This column marks the 12th year of columnification on news of interest to herpetologists from around the world. It functions as a reader-supported column by using only those items received from readers. You can contribute, too. Merely send whole pages of newspaper/magazines/etc. or clip the article being sure to attach the date/publication slug and your name to each page. Mail to: Ellin Beltz, 1647 N. Clybourn Avenue, Chicago, IL 60614-5507. All contributors are acknowledged either with their story or at the end of each column.

Lost and found in Wisconsin

- A 4-foot iguana known as “Sweet Pea” disappeared from a third-story balcony in September and was found 10 miles away in a tree. “We got her in the nick of time, especially with the weather getting cold,” said the lady in whose care the animal was when it disappeared. *The Wisconsin State Journal* reports: “It is unknown how a lizard could travel that far from a busy downtown location. . . . A big lizard is not the sort of animal to which a motorist would offer a ride. . . .” [October 18, 1997, from Dreux Watermoelen]
- A 3-foot ball python vanished in a University of Wisconsin–Madison dormitory. Authorities are not amused and have instituted a search even though residents seem undismayed. Some speculate that Merlin did not slither away solo, but was taken from its cage in a female student’s room in Sellery Hall. One resident said that officials were “acting like it’s some kind of national emergency.” [*Wisconsin State Journal*, October 7, 1997, from Dreux Watermoelen]

At least they’re consistent

- “Two Japanese men headed to a reptile breeders’ show in Orlando are in the Seminole County Jail this weekend after their arrests on animal-smuggling charges . . . at Orlando International Airport by agents from the U.S. Fish and Wildlife Service with help from the U.S. Customs Service and Orlando police. Agents found eight snakes thought to be from Southeast Asia in [one man’s] suitcase. Two turtles were in [the other man’s] suitcase, . . . thought to be worth up to \$70,000.” wrote *The Orlando Sentinel* [August 17, 1997, from Alan Rigerman]. The story added that one of the men arrested in this incident had been charged by an Orlando grand jury only ten days previously for the smuggling of 64 Fly River turtles and 113 snakeskin turtles in April of 1996. A spokesperson for the Orlando Reptile Breeders’ Expo said that the group requires all live merchandise to be captive bred and does not condone smuggling.
- Regular readers will recall news stories from 1995 when a man in Prince William County, Virginia, was envenomated by a pet cobra. At that time, authorities seized 22 venomous snakes and seven tarantulas from his apartment. He said he would buy no more cobras while he lived in the county and avoided punishment for violating the law of possessing wild or exotic animals in the county. The December 5, 1997, *Roanoke*

Times reports: “A man who was bitten as he milked venom from his pet cobra required a double dose of lifesaving anti-venin to save his life doctors said . . . [it] was the second time in two years he had been attacked by one of the deadly snakes he kept in his Prince William County apartment. After he was bitten, police removed 10 poisonous [sic] vipers, including Indian cobras and a water moccasin, said Prince William County police spokeswoman. . . . In 1995 [the same man] was bitten on the hand as he reached for a cobra that had started to leave its cage. . . . No charges had been filed . . . relative to the snakes seized this week. . . .” [from Mark T. Witwer]

Wander Indiana safely

The Indiana State Department of Natural Resources issued an emergency regulation prohibiting the sale of any native or dangerous snake, frog, crocodile, turtle or other reptile or amphibian in direct response to the numbers of sales of native reptiles and amphibians. The director of the Department said that overcollection of native animals would upset the ecological balance. In addition he said that the regulation protects the public by prohibiting the sale of dangerous reptiles and amphibians. Possession of the animals remains legal. “Dangerous” is defined as including any venomous or poisonous snake, frog, toad, lizard or other species that can seriously injure a person or animal. Crocodiles over 5 feet and lizards over 6 feet are not permitted to be sold and no portion of the animal, eggs or offspring of a dangerous animal can be sold. To receive the full text or to comment on their intention to enact permanent rules on this subject, contact: DNR, Division of Fish and Wildlife, 402 W. Washington Street, Room W273, Indianapolis, IN 46204. [*The Chesterton Tribune*, December 9, 1997, from Chuck Keating and *The Courier-Journal*, December 17, from E. A. Zorn]

Your traffic hot spots

- Over a thousand animals about to be smuggled into the U.S. were found by Peruvian authorities. Anacondas, water snakes, black crocodiles, iguanas and rare species of frogs, lizards and turtles from Peru’s Amazon jungle, were packed in crates marked “ornamental fish” bound for Los Angeles, California. Nearly a third of the animals were dead when discovered, apparently killed by sedatives given them by the herpetotraf-ficantes. [*Albuquerque Journal*, August 26, 1997, from J. N. Stuart] The story continues in the Little Rock, Arkansas, *Democrat-Gazette* [August 28, 1997, from Bill Burnett], “While the exact number of exotic animals captured and sold in Peru is unknown, they can be easily purchased in downtown Lima. Until city authorities swept through Ayacucho Street last month, the animal market resembled a sidewalk zoo. . . . The World Wildlife Foundation estimates global trade in illegal animal trafficking at more than \$5 billion a year.” One wonders how much the legal trade is worth.
- A Kansan and a Louisianan were indicted in Topeka, Kansas, on charges of illegally buying and selling more than 1,000 box turtles. “Kansans view [the turtles] as cute curiosities,

with their small dark shells marked with yellow and orange-yellow lines. But to those who engage in the illegal business of capturing and shipping them abroad, they look more like four-legged dollar signs,” according to the Houma, Louisiana, *Courier* [October 26, 1997, from Ernie Liner]. The story adds a quote from Joe Collins, herpetologist emeritus of the University of Kansas Museum of Natural History, that while American collectors get about \$5 to \$10 for each turtle, Japanese collectors pay \$300. Most of the animals are put in ornamental gardens and cared for carefully; however mortality rates between capture and final sale are “inordinate,” he commented. If convicted, the two men face sentences of up to 11 years in jail.

- “Brazilian authorities have saved about 8,000 freshwater turtles and other wild animals that were destined to be served up as illegal delicacies in the Amazon region, an environmental official said. . . . Police arrested four people aboard a boat carrying the animals on . . . one of the Amazon River’s main tributaries. . . . Traditional Amazonian dishes include grilled turtle steak, a stew of turtle innards and brains and a turtle roast served with manioc flour piled in the animal’s shell,” according to the *Chicago Tribune* [August 13, 1997, from Scott Keator and Ray Boldt].

UV-B determined cause of salamander decline

“Biologists have shown for the first time that excess ultraviolet rays from natural sunlight kill amphibians, an ominous sign of the dangers of solar radiation leaking through a thinning ozone layer. . . . Natural sunlight contains enough ultraviolet-B radiation to kill most embryos of the long-toed salamander in mountain lakes of the Cascade Mountain Range. . . . [One scientist] cautioned that the result applies to only one animal species and does not prove that UVB is the cause for all of the declines of frogs, toads and salamanders [worldwide],” as reported in the *Chicago Tribune*, December 9, 1997, from Claus Sutor and Ray Boldt]

Farm bites state

A judge has ruled that the state of Louisiana must pay more than \$4.6 million in damages to an alligator farm raided by the state Department of Wildlife and Fisheries in 1991. Agents had seized 358 alligator skins and issued summonses to the company and one employee for alleged violations of alligator tagging and skinning laws. Charges were dropped in 1992, and the company filed for Chapter 11 bankruptcy. The judge ruled that the company “proved that the outrageous actions of the defendant (DWF) caused serious damages,” and the state plans to appeal, noting that Louisiana does not maintain insurance for this type of situation and would be forced to spend tax funds to fulfill the court order. [*The Times-Picayune*, New Orleans, LA, July 4, 1997, from Ernie Liner]

The following not suitable for more sensitive readers

From Clifton, New Jersey comes the story of a man “attacked by his pet 8-foot python . . . [and] rescued by his sister, who heard his screams and cut off the snake’s head with a butcher knife. The snake sprang up and bit [the 28-year-old man] on the cheek after he opened the top of its tank to give it a drink

Monday. It curled around his neck as it hung onto [his face] Police said . . . [his sister] cut off the python’s head. When the snake would still not let go, she cut off another chunk of its body, which fell to the floor and slithered under a bed, police said. She then pulled the head off her brother’s face. . . . He was treated at a hospital and released. [CNN, September 2, 1997, and UPI September 3, 1997, both from Wes von Papineau and Kimberley Heaphy, and Orlando *Sentinel*, from Bill Burnett]

Adam Smith at work in the bayou

Prices for the skins of Louisiana alligators have fluctuated over the last 25 years. For those who like this sort of thing, the raw numbers are: 1972, \$8.10; 1982, \$13.50; 1992, \$23.00; 1993, \$23.00; 1994, \$37.00; 1995, \$41.00; 1996, \$25.00; 1997, \$18.00. Wildlife officials speculate that the large catch in the last few years may have driven skin prices down, but also point to world market conditions and farm-raised alligators as factors in the price changes. [*The Times-Picayune*, New Orleans, LA, September 10, 1997, from Ernie Liner]

More numbers

Another interesting factoid is U.S. state spending on endangered species by type and in percent: Birds, 37; Mammals, 33; Fishes, 13; Plants, 8; Invertebrates, 5; Reptiles and Amphibians, 4. [*Endangered Species Survey*, 1996, from the International Association of Fish and Wildlife Agencies, reprinted in *Audubon*, September-October 1997, from J. N. Stuart]

An ode to amplexus and a plea for the horny toad

From the *Sonoran Herpetologist* [10(8) 1997] comes the following with apologies to Paul Simon and to the tune of “50 Ways to Leave Your Lover.”

The problem is all inside your head, she croaked to he.
It’s been ten long months; the answer’s plain to me.
So let me feel your thunder while it’s raining, see,
You got fifty days to breed your lover.
She croaked, “It’s really not my habit to be bold.
But your song’s so nice and your colors green and gold,
(sigh) have me wanting you; love has taken hold.
You got fifty days to breed your lover.
[chorus]
Just slip on the back, Jack.
Amplexus’ the plan, Stan.
Don’t need to be coy, Roy—
Sing your night songs to me! . . .

There’s more (probably from the inimitable pen of Roger Repp), but as the CHS has always been a “family” herpetological society, I leave you to search the THS herp society page for the rest and their update on conservation of the flat-tailed horned lizard lawsuit <<http://www.azstarnet.com/~bsavary/announce.html>> .

Not limited to North America

From Rod Douglas of the National Museum at Bloemfontein, South Africa, come two clippings of advertisements not beneficial to reptiles. The first shows a rock python and is cap-

tioned “It’s 53 degrees in the shade, and you haven’t eaten for seven days. You have three choices, Braise it. Fry it. Grill it (on our advertised gas grill). . . . Rumour has it that when cooked on the global range, a choice cut of rock python will melt in the mouth. But even we find that a little bit hard to swallow.” Please remember that the temperature is in Celsius. The second ad shows a cooler being held by an alligator skeleton. The caption reads: “The Nile crocodile’s tenacity is legendary. So is its stupidity.” Both appeared in *Getaway* magazine, September 1997. Rod wrote the manufacturer and received a reply: “I can assure you that these advertisements are not intended to encourage any harm. . . . We understand and appreciate your discomfort; however, in our pretesting of the advertisement, we confirmed that most people fear snakes especially larges (sic) ones and would do their level best to avoid any close contact with a snake. . . . We have nevertheless passed on your letter to our advertising agency for their comments and a response. . . .”

Florida environmentalist dies

Marjorie Carr, the widow of Archie Carr, and a passionate environmentalist in her home state, died at the age of 82. She served on numerous committees, testified, wrote letters and lobbied legislators and was instrumental in the preservation of Florida habitats. Expressions of sympathy may be made by donations to Florida Defenders of the Environment, 4424 NW 13 Street, Suite C-8, Gainesville, FL 32609, according to a family spokesperson. [*The Gainesville Sun*, October 11, 1997, from Kenneth C. Dodd, Jr.]

Quote of the month

From the *Arizona Tribune*: “An East Valley lawmaker wants colleagues to honor something with a small brain. And no, it isn’t a politician. . . . [He] introduced legislation to make the

Dilophosaurus the official state dinosaur. . . . It is the only known dinosaur unique to Arizona.” [December 12, 1997, from Tom Taylor]

Letters:

- “Your snippets of information are always most interesting and HerPet-Pourri is most popular. As Chairman of the, unfortunately, now-defunct Free State Herpetological Association, I reprinted many items from your column in our Newsletter. I know that sometimes you most probably feel the task is rather thankless, but remember that there are people all over the world, like myself, who read your column and appreciate it, but perhaps never have reason to write and tell you so-keep up the good work. Rod Douglas” Bloemfontein, South Africa. *Thank you for writing. I sometimes wonder if there’s anybody out there, but then along comes a letter like this to remind me that we really do have over 1,000 members around the world!*
- “Sorry to hear about your misfortune. Hope you are able to get your household back to normal—as is possible—after such a disaster. Ray Boldt” Chicago, Illinois. *We’re getting there. December was the month of living out of the half-bath and the kitchen sink while the regular bathroom was getting new walls and floor. The tub is lying on its back in the living room with its four little feet pointing straight up. It looks like it died or something. We hope to finish everything by about May this year.*
- “Hope your e-mail situation is resolved soon. . . . E. A. Zorn” Yup. *New address <ebeltz@ripco.com>.*
- “Best wishes for the holidays, like ‘Have a toadally herpy New Year’. Claus Sutor.” *We did have a very merry hiss-mus and a hoppy New Year. Thanks for thinking of ussss.*

News and Announcements

1998 NYTTS TURTLE POSTER CONTEST

The New York Turtle and Tortoise Society has announced its 1998 Turtle Poster Contest. The poster should depict threats facing turtles in general, or may focus on one particular species. Some examples might include, but are not limited to, overhunting for food and pets, pollution, road kills, loss of habitat and boat hits. Ninja Turtles are not allowed as subject matter. Posters should be submitted on heavyweight posterboard and can measure either 12 × 18" or 18 × 24" in size. Entries will be grouped according to age and grade level. Mediums suggested are paint, magic marker, inks or collage. Name, address, phone number, age, grade and name of school, if applicable, should be clearly printed on the back of the poster. All entries will be judged by a panel of conservationists, artists and teachers on the basis of content, originality and artistic merit. Prizes will include official Turtle Society T-shirts, books, and a one-year membership to the New York Turtle and Tortoise Society. Winning posters will be exhibited at the 24th Annual Turtle and Tortoise Show in New York City during June 1998. All entries must be postmarked by May 31, 1998. No entry will be accepted before Feb 15, 1998. Mail entries to Poster Contest, New York Turtle and Tortoise Society, c/o Lorri Cramer, 750 Columbus Avenue, New York NY 10025. All posters become the property of the Turtle Society and cannot be returned. If you have any questions on appropriate subject matter and rules, contact Ms. Cramer at (212) 459-4803.

Unofficial Minutes of the CHS Board Meeting, December 19, 1997

The meeting was called to order at 7:49 P.M. Board members Greg Brim, Ty Park and Steve Spitzer were absent.

Officers' Reports

The minutes of the November Board of Directors meeting were read, corrected and accepted.

The Treasurer's Report was reviewed and accepted.

Membership secretary John Driscoll reported current membership at 1088.

President Steve Spitzer was not present, report per Mike Dloogatch: Steve has signed a one-year agreement with North Park Village for our 1998 board meetings. The meeting dates for our general meetings at the Field Museum are secure as well. The next board meeting will be January 16 at North Park Village.

Vice-president Jack Schoenfelder distributed the latest update (no changes) on our 1998 speaker roster.

Committee Reports

ReptileFest 1998: Lori King-Nava announced that the 1998 committee is now forming. The possibility of obtaining corporate sponsors was discussed. We can obtain corporate endorsements, but if we wish to keep our nonprofit status, we cannot use adjectives to show any product support, i.e., "sponsored by Budweiser Beer" is okay, not "Budweiser Beer tastes great."

Old Business

CHS youth auxiliary: Audrey Vanderlinden reported that there has been very little membership response in the matter. We will continue to solicit interest from the membership to determine if this club can be established.

Flower and Garden Show: Steve Spitzer had told Mike Dloogatch that some nonprofit groups were pulling out because the show management will not provide insurance coverage. Some discussion ensued to determine if we still want to participate. Discussion was tabled until we can talk with Steve.

CHS website: Jenny Picciola announced that our website would soon have a new and improved "contents" page.

Grants: We still need a committee and chairperson for this. John Driscoll is considering the chair position and Byron de la Navarre volunteered to serve on the committee.

Mike Dloogatch received an E-mail from David Hardy, Sr., on behalf of the ASIH, thanking the CHS for its contribution to the Henry Fitch scholarship endowment.

New Business

John Driscoll moved that the CHS allocate \$2000 for grants in 1998. The motion was seconded by Mike Dloogatch. After discussion, the motion passed unanimously.

The CHS received a letter from NISC requesting a free subscription to the *Bulletin*, in exchange for which they would abstract relevant articles for inclusion in their wildlife database. The board approved.

Dr. Byron de la Navarre asked for the board's permission to use the CHS membership list to let local members know that he has relocated his veterinary practice. The board approved this action.

St. Louis Zoo trip: Audrey Vanderlinden is looking to the second week in June to do a field trip to the St. Louis Zoo. Details will be announced in the *Bulletin* and at the general meetings as soon as this trip is organized.

Audrey also mentioned that she would like to see someone organize a CHS Picnic this year. See her for any questions.

Gary Fogel moved that the CHS reimburse him \$30 for expenses incurred in holding the board meeting at his house this month. Mike Dloogatch seconded. The motion passed with Audrey Vanderlinden voting against and Gary Fogel abstaining.

The meeting adjourned at 8:55 P.M.

Respectfully submitted by the Recording Secretary
Audrey A. Vanderlinden



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Herpetology 1998

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

CONCHO WATER SNAKE SPATIAL ECOLOGY

M. J. Whiting et al. [1997, J. Herpetology 31(3):327-335] studied the distribution, movements, activity range, and habitat use of the Concho water snake, *Nerodia harteri paucimaculata*, by mark-recapture and radiotelemetry in a large lake system in central Texas. Concho water snake emigration and distribution were largely driven by alteration of habitat availability caused by fluctuating water levels. Habitat characteristics associated with the presence of snakes at the study area were turbid water, minimal wave action, a gentle shore-line gradient, a silt substrate, and a rocky shoreline. Males and gravid females were equally vagile, and the likelihood of a snake undertaking an emigrational movement was independent of age and/or reproductive condition. However, males had significantly more movement days than gravid females. Radiotagged males had detectable movements on 64% of monitored days, compared to 43% of monitored days for gravid females. Mean activity range length was 278 m for males, 219 m for gravid females, and 210 m for juveniles. Concho water snakes generally selected retreat sites within 3 m of water, although gravid females selected sites as far as 15 m from water. As a management procedure for lake populations, the authors advocate increasing the vertical distribution of rocky shoreline.

NEW MADAGASCAN FROG

F. Glaw and M. Vences [1997, Copeia (3):572-578] describe a new species of rhacophorine frog, *Boophis xerophilus*, from deciduous dry forest of western Madagascar. The new species is the only known representative of *Boophis* that is probably restricted to arid habitats. Males are characterized by a silvery back with distinct dark markings, a blackish throat, and advertisement calls. The new species belongs to the *B. tephraeomystax* group, members of which are distinguished from other *Boophis* by the combination of very reduced or absent webbing between fingers, breeding in shallow, often temporary pools, small eggs with a blackish animal pole, and a golden or copper iris with an indistinct grayish periphery.

GALÁPAGOS LAND SNAKES

R. A. Thomas [1997, Herpetological Natural History 5(1): 19-40] reviews the origins and systematics of the terrestrial snakes of the Galápagos Archipelago. He recognizes four species: *Philodryas hoodensis* (Van Denburgh), new generic arrangement; *Antillophis slevini* (Van Denburgh), new generic arrangement; *Antillophis steindachneri* (Van Denburgh), resurrected with new generic arrangement; and *Alsophis biserialis* (Günther). He recognizes three subspecies of the latter (all new combinations): *A. b. biserialis* (Günther); *A. b. dorsalis* (Steindachner), and *A. b. occidentalis* (Van Denburgh). According to the author, their relationships to mainland and West Indian species indicate that there have been at least three invasions.

THE FLATWOODS SALAMANDER IN FLORIDA

J. G. Palis [1997, Herpetological Natural History 5(1):53-65] surveyed 393 wetlands in 22 Florida counties from 1990 through 1995 for the presence of *Ambystoma cingulatum* larvae. He sampled wetlands at or near previous collection sites, or sites elsewhere that were ecologically similar. In addition, he sampled 24 breeding sites annually from 1991 through 1995 to assess variation in reproductive success. Larval *A. cingulatum* were observed at 82 sites (20.8%) in 11 counties. Breeding sites were small ($\bar{x}$ = 1.49 ha), shallow ($\bar{x}$ = 39.2 cm), acidic ($\bar{x}_{\text{pH}}$ = 4.2), isolated wetlands in pine flatwoods or savanna. Sixty-five of these known breeding sites (79.3%) occurred on public lands. Three times as many wetlands were sampled on public than private lands, but breeding sites were encountered with similar frequency on public (22.2%) and private (17%) lands. Thirty-one (70.5%) of 44 historic collection sites were resampled; larvae were observed at 11 (35.5%) of these. Proportionally, more extant breeding sites occurred in pine flatwoods or savanna (42.3%) than in pine plantations (11.4%). There are at least 33 breeding populations of *A. cingulatum* in Florida, 24 of which (73%) are known from only one breeding site. *Ambystoma cingulatum* larvae were observed in 6-23 (12-96%) of the 24 breeding sites sampled annually. Sampling success was presumed to reflect breeding success, which, in turn, was thought to be influenced by variation in seasonal patterns and amount of rainfall. Threats to the species may include habitat conversion for silviculture, agriculture, and real estate development; fertilizer application; road construction; and bait harvesting. The species' apparent susceptibility to anthropogenic alterations of the landscape suggests that its status in Florida is precarious and that legal protection is warranted.

VARIATION IN HERMANN'S TORTOISES

G. Guyot and B. Devaux [1997, Chel. Conserv. Biol. 2(3): 390-395] compared shell size and color among four populations of *Testudo hermanni* in Greece, mainland France, Corsica and Spain. They found significant differences in adult body size, shell morphology, and color. Females were larger than males in the western populations but not in the Greek population. Females in Corsica were the largest; Spanish males were the smallest. The trapezoidal shell form of males is most pronounced in the Greek population, in which the back of the shell is greatly broadened. This character is highly variable in Corsica but did not differ between French and Spanish males. The western populations differed in yellow shell color shades and plastral pattern, but the Greek population was highly variable in these characters. The authors conclude that because of pronounced variation among populations, it is essential that management efforts consider the conservation of local adaptations in relocation programs through careful selection of individuals and strict attention to locality of origin.

PREDATION OF CAPTIVE REPTILES BY AN INTRODUCED ARGENTINE ANT

J. Lemm [1997, Bull. Assoc. Reptilian and Amphibian Veterinarians 7(3):4-5] notes that since its introduction into the U.S. in New Orleans around 1891, the tiny, black Argentine ant, *Linepithema humile*, has spread rapidly, especially in California. In the last 10 years it has become one of the most serious household pests in southern California and recently it has become a problem for captive reptile collections as well. The driest months, May through September, are when most reports of ant predations have occurred. The author's personal collection was swarmed in July 1997. All of the cages containing tropical reptiles were swarmed. The ants had apparently been looking for water as the water bowls in these cages contained a layer of drowned ants nearly two inches deep. From there it appears the ants happened upon the reptiles, *Rhacodactylus ciliatus*. One male was covered in ants and had nearly all of his flesh consumed. The remaining pair, with only 10 to 20 ants on each, were quickly cleaned off and seemed to be doing well. Both were dead the next day. In other swarmed enclosures, containing *Anolis* sp., none of the animals had been attacked. Drier enclosures with sand substrates were not swarmed. Two days later, despite the entire cage being placed in a pan of water, three *Anolis* were found dead with nearly all of their soft tissue removed. An adult *Nephrurus* also succumbed, though only 10 ants were attached to this gecko and were quickly removed. Similar attacks under like circumstances took place in the collections of other reptile keepers in southern California during the summer of 1997. Only tropical enclosures or enclosures sprayed with water were attacked. Fatalities of numerous lizard species occurred, including *Abronia*, *Coleonyx*, *Paroedura* and *Uroplatus*. Even young monitor lizards (*Varanus exanthematicus*) were taken. Predation on a *Dyscophus* frog was also reported. Snakes are rarely killed by the ants. Of the two snake fatalities known to the author, one was killed attempting to emerge from its birth membrane, and the other was a young snake that had just finished shedding. Several safeguards are mentioned. The author recommends protecting smaller cages by either putting the entire cage in a pan of water or resting the cage on legs that are submerged in water. The pesticide diazinon can be used to protect larger reptile facilities. But the author cautions that pesticides should be used only as a last measure as they harm native insects and possibly other native species.

THE EFFECT OF FLOODS ON HIBERNATING TOADS

W. Bosman et al. [1997, Amphibia-Reptilia 18(4):339-346] report the effects of inundation on terrestrially hibernating *Bufo bufo* and *B. calamita*. Mortality caused by experimental inundation of seminatural hibernation sites was high in *B. calamita* and very low in *B. bufo*. In a floodplain eight telemetrically monitored *B. bufo* withstood flooding during a period of 25-35 days without leaving their hibernation sites. After this period the emerging toads suffered some mortality from floating down the river, depending on the water level at the moment of emerging. The authors conclude that more attention should be paid to the preservation and creation of flood-safe areas in nature development projects in floodplains.

FOOD HABITS OF THE ILLINOIS CHORUS FROG

J. K. Tucker [1997, Herpetological Natural History 15(1): 83-87] notes that although the fossorial Illinois chorus frog, *Pseudacris streckeri illinoensis*, is thought to be able to feed underground, the food habits of this frog in nature are unknown. In 1994 he collected 23 road-killed Illinois chorus frogs in Madison County, Illinois. At the same time he collected 39 specimens of *P. triseriata* for interspecific comparisons of food habits. Although the sample size is small, the results offer insights into the feeding ecology of the Illinois chorus frog and are the first reported for this frog from nature. Stomach contents of *P. s. illinoensis* were dominated by larval dingy cutworms, *Feltia ducens*, both in number of items (45.8%) and by mass (84.5%). Of the 17 frogs with intact stomachs, 64.7% of them had eaten this cutworm. In contrast *F. ducens* was found in the gut of only a single *P. triseriata*. Although it made up only 3% of the items found, this single cutworm accounted for 52.5% of the mass of all food items found in *P. triseriata*. The author notes that predation on these larvae may have important implications for frogs in agricultural areas. Cutworms can be a crop-damaging insect and insecticides may be applied to reduce their numbers. The amphibians may ingest insecticides indirectly by eating contaminated cutworms. Although sample sizes were too small to support statistical comparisons, preliminary intraspecific and interspecific comparisons of stomach contents of frogs that contained one or more food item were interesting. For instance, stomach contents of male and female *P. s. illinoensis* were similar in the number and mass of items. In contrast, stomachs of male *P. triseriata* contained fewer items that weighed less than the contents of females' stomachs. The two species also differed in the number of frogs that had empty stomachs. A single male *P. s. illinoensis* had an empty stomach. In contrast, 13 of 28 male and 7 of 11 female *P. triseriata* had empty stomachs. Based on this study, the author proposes that interspecific differences in the proportion of frogs with empty stomachs may be an important finding and should be reported in studies of food habits.

SEXUAL DICHROMATISM IN COLLARED LIZARDS

J. K. McCoy et al. [1997, Copeia (3):565-571] recorded the color of male and female collared lizards (*Crotaphytus collaris collaris*) from three populations using reflectance spectrophotometry to examine interpopulation differences in sexual dichromatism. The degree of sexual dichromatism within this species varied significantly among local populations. They also examined brightness of coloration and sexual dichromatism in these populations using appraisal by naive observers. Subjective appraisal also showed significant differences among these populations. However, the population appraised as most brightly colored was not appraised as most dichromatic. This study demonstrates that sexual dichromatism may vary significantly among populations of a single species. Although subjective appraisal of sexual dichromatism may yield reliable results when carried out under carefully controlled conditions, assessment of a single pair of individuals or assessment of only male coloration is not sufficient for a study of sexual dichromatism.

SIGNIFICANCE OF BASKING IN AN AUSTRALIAN TURTLE

B. Manning and G. C. Grigg [1997, *Copeia* (3):579-584] measured body temperatures of free-ranging Brisbane River turtles, *Emydura signata*, with radiotelemetry. These and other species of freshwater turtle are commonly observed “basking” on logs or other elevated sites, a behavior that is usually interpreted as thermoregulatory. However, body temperatures of eight *E. signata* monitored for more than 112 turtle days in winter, spring, and summer showed a striking thermoconformity with the water and provided no data showing that this species routinely elevates its body temperature above water temperature. The biological significance of basking is obscure in this population of *E. signata*, and the study highlights the need for direct measurements of body temperature in free-ranging individuals of other freshwater turtle species.

INCUBATION OF RED-EARED SLIDER EGGS ON WATER-SATURATED SUBSTRATES

J. K. Tucker et al. [1997, *Chel. Conserv. Biol.* 2(3):345-351] exposed early-stage (19–22 day old) and late-stage (39–42 day old) embryos of the red-eared slider turtle (*Trachemys scripta elegans*) that began incubation on substrates of three different water potentials (dry, intermediate and wet) to water-saturated substrates for five different exposure intervals (1, 6, 12, 24, and 48 hrs). Exposure of early-stage embryos had no significant effect on survivorship for any exposure interval regardless of initial substrate water potential. Exposure of late-stage embryos caused dramatically reduced survivorship when exposure exceeded 12 hrs. Survivorship of eggs exposed for 24 and 48 hrs regardless of substrate was 0%, whereas it was 100% for all other exposure intervals. Exposure of eggs containing early-stage embryos for periods as short as 1 hr allowed rapid uptake of water by the eggs. Water uptake was most pronounced among eggs incubated on the driest substrate even though a narrow range of relatively wet substrates was used. Eggs containing late-stage embryos exposed for less than 24 hrs also took up water, but these changes in egg mass did not translate into increased hatchling mass. Results support the hypothesis that nest inundation at later stages of embryogenesis is more detrimental to embryonic survival than nest inundation at earlier stages. The nesting season for turtles in the study area coincides with the end of the spring flood pulse as it existed historically prior to modifications of the hydrologic regime by dams. When coupled with unpredictable natural events such as the 1993 flood, altered hydrologic regimes are detrimental to turtles that may time nesting to coincide with decreasing water levels.

CHECKLIST OF INDIAN REPTILES

I. Das [1997, *Hamadryad* 22(1):32-45] presents an updated checklist of reptiles (species and subspecies) recorded from the Republic of India, along with their authorities and suggested common names. The list is significantly larger than those being currently used for biodiversity estimates of this fauna, and contains 484 species, of which 182 (37.6%) are endemic.

A NEW SPECIES OF TOAD FROM OAXACA, MEXICO

J. R. Mendelson III [1997, *Herpetologica* 53(2):268-286] reviews the status of the populations of toads referred to *Bufo cavifrons* that occur in lower montane areas west of the Isthmus of Tehuantepec, Mexico. The populations in the Sierra de Juárez and Sierra Mixe, Oaxaca, are described as a new species, *Bufo spiculatus*. The name *B. cavifrons* is restricted to the topotypic population in the isolated volcanic Sierra de los Tuxtlas, Veracruz. The poorly known species *Bufo cristatus*, from the Sierra Madre Oriental, is rediagnosed with respect to these other species. The natural history of all three species is briefly reviewed; all seem to inhabit primary forest, and *B. cristatus* and *B. cavifrons* breed in streams.

ORIGIN OF THE CROTALINE RATTLE

N. R. Sisk and J. F. Jackson [1997, *Copeia* (3):485-495] propose the term “sclerophyma” for an enlarged and hardened tail tip of a snake. They suggest that the capability to retain sclerophymal exuviae that were mobile, i.e., origin of the protorattle, was contingent on prior evolution of longitudinal bilobing of the sclerophyma. They tested two hypotheses for initial functional advantage of such bilobing: the luring effectiveness hypothesis based on putatively greater visual attractiveness during caudal luring, and one version of the dual contact hypothesis based on putatively greater sound intensity and/or greater audiospectral equitability during tail vibration. Simulated caudal luring that included a bilobed sclerophyma was not more attractive to fence lizards than luring with a conical sclerophyma. Sound intensity produced from mechanically vibrated models of bilobed sclerophymae was lower than sound intensity from other types of sclerophymae, whereas broad-bandedness of the sound was similar to that of other types. In the absence of support for either hypothesis, the authors discuss possibilities for future research, particularly the need to determine the form of the relationship between sound intensity and the force exerted by the sclerophyma.

SEX RATIOS IN *PODOCNEMIS EXPANSA*

N. Valenzuela et al. [1997, *Herpetologica* 53(3):390-398] studied the relationship between fluctuating temperatures in the field and sex ratios of the giant river turtle (*Podocnemis expansa*) obtained from nests incubated in seminatural conditions using a stepwise logistic regression model. Nests used in the study were from beaches along the Middle Caquetá River, in Colombian Amazonia. The number of hours above 31°C and mean temperature above 31°C during day 29-30 were the two parameters that best explained sex ratios. Incubation temperatures of natural nests were also monitored. Mean incubation temperature and the combination of mean and variance were not predictors of sex ratio. There was a beach effect on sex ratios and incubation time. Natural nests hatched earlier than seminatural nests. Length of the incubation period was negatively correlated with degree days and mean incubation temperature in seminatural nests but not in natural nests. There was no evidence found for an influence of length of the incubation period on sex ratio. The results of this study support current conservation practices in the region.

EGG-EATING IN BEADED LIZARDS

A. Herrel et al. [1997, J. Herpetology 31(3):383-393] note that the beaded lizard (*Heloderma horridum*) is a large diurnal predator that feeds predominantly on juveniles in vertebrate nests and eggs. Bird eggs constitute a special problem for predators as the energetic content is shielded by a hard calcareous shell. Still, eggs of ground-nesting birds such as quail constitute a large part of the diet of *Heloderma horridum*. The authors investigated the mechanics of the egg-eating behavior in *H. horridum*. They examined the morphology of the feeding system, measured egg toughness, and calculated bite forces of *H. horridum*. Additionally, they videotaped feeding sequences and simultaneously recorded the activity patterns of the jaw muscles. Egg-eating behavior consists of a fixed behavioral pattern including five distinct stages: approach, piercing, uptake, crushing, and swallowing. Two of these (piercing and crushing) can be directly related to the egg-eating behavior in *H. horridum*. The piercing stage consists of several bites during which the anterior teeth are used to puncture (but not crush) the egg. Next, during the crushing stage the egg is crushed within the oral cavity (no longer any tooth contact). Based on the results, the authors conclude that behavioral adaptations and subtle modifications of the motor patterns during feeding are present in *H. horridum* that allow the lizard to be an efficient oophagous predator.

A NEW FROG FROM THE BOLIVIAN ANDES

S. Reichle and J. Köhler [1997, Amphibia-Reptilia 18(4):333-337] describe *Eleutherodactylus zongoensis*, new species of frog from Valle del Zongo, Departamento La Paz, Bolivia. This species of the *E. discoidalis* group is most similar to *E. cruralis*, but differs in dorsal tuberculation, color, and head proportions. This species is known only from the type locality. The holotype was found during the day in a small cavity under a large stone. The habitat was disturbed montane rainforest.

A NEW SPECIES OF LEOPARD GECKO

I. Das [1997, Hamadryad 22(1):13-20] shows that the disjunct population of leopard geckos, genus *Eublepharis*, from western India (Gujarat, Maharashtra and Karnataka) is not conspecific with *E. macularius*. Originally described as a subspecies of *E. macularius* by Börner (1981), *Eublepharis fuscus* is demonstrated to be both diagnosable and allopatric with congeners, and therefore elevated to species status and a neotype designated. *E. fuscus* differs from known congeners in possessing the following combination of characters: six postnasals contacting nasals; eight supralabials to a point below pupil; mental small, hexagonal, longer than wide and about twice as long as the first pair of postmentals; prefrontal region with smooth, flat scales; large granular and nonspinose tubercles on the dorsum; tubercles smaller than intertubercular regions; 42 midbody scale rows across belly to below lateral row of tubercles; 10-11 preanal pores; femoral pores absent; subdigital scansors entire, smooth; toe IV longer than toe III; a single broad pale dorsal band between the nuchal loop and caudal constriction; and maximum SVL recorded, 252.0 mm.

DIET OF THE CHICKEN TURTLE

J. P. Demuth and K. A. Buhlmann [1997, J. Herpetology 31(3):450-453] studied the diet of the chicken turtle, *Deirochelys reticularia*, on the Savannah River Site, Aiken County, South Carolina. Attempts to gut-flush the turtles brought little success, which the authors attribute to the long neck in this species. Hence, the technique was abandoned to prevent injury to the animals. Diet was instead determined by fecal content analysis. The study found that chicken turtles are almost totally carnivorous in South Carolina during June and July, with dragonfly nymphs the most frequently consumed food items. The authors agree with a previous hypothesis that the often-observed low population densities of *Deirochelys* relative to other emydids likely reflect their carnivorous diet. Low densities of another carnivorous turtle (*Chelodina longicollis*) have been attributed to competition with fish for aquatic insects. In permanent bodies of water that contain fish, notably sunfish and catfish, dense populations of *Deirochelys* are less likely to be found, whereas seasonally fluctuating Carolina bay wetlands that do not contain fish, appear to have greater numbers of *Deirochelys*. Maintaining ephemeral wetlands may be important in sustaining thriving populations of this turtle.

A NEW GENUS AND SPECIES OF SKINK

I. S. Darevsky and N. I. Orlov [1997, J. Herpetology 31(3):323-326] describe *Paralipinia rara*, a new genus and species of lygosomine skink, from tropical rain forests on the Tai-Nguen Plateau of southern Vietnam. It differs primarily from other Asiatic scincids in having double rows of subdigital pads, which are presumably associated with an arboreal mode of life. The sole specimen of this lizard was taken at night under the canopy of the tropical rainforest, on the trunk of a stout tree at a height of about 2 m from the forest floor. The species name derives from the opinion of the authors that this arboreal skink is a very rare species, based on the fact that no other specimens were found in their collections done in various seasons and years. The authors speculate that the rarity of *Paralipinia* indicates that this small skink normally lives in tree crowns, and only rarely descends near to the ground.

REPRODUCTIVE ECOLOGY OF *BOMBINA VARIEGATA*

J. Barandun et al. [1997, Amphibia-Reptilia 18(4):347-355] studied individual reproductive behavior and survival of *Bombina variegata* in a dynamic habitat with a variety of rain-filled ponds from 1990 to 1992. Most animals reached sexual maturity at the age of two years. Annual adult survival was at least 62%. Individual females, on average, laid between 40 and 70 eggs per "clutch." While about 12% of the breeding females spawned a second time within the season, a similar proportion did not seem to spawn every possible year, probably depending on climatic conditions. The results are consistent with ultimate predictions from life history theory, but the proximate mechanisms of ovulation and spawning in response to environmental conditions remain to be investigated.

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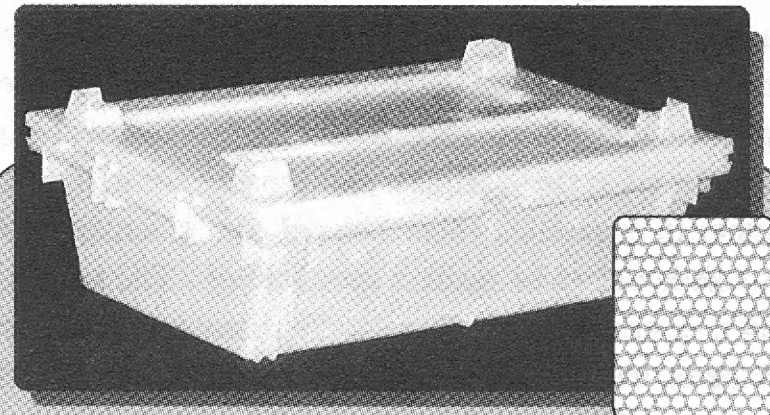
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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, January 28, at the Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, in Chicago. **Charles M. Roth** of the Chesterton [Indiana] Feed and Garden Center will speak on "Installation and Care of Ponds, with Emphasis on Indoor Ponds." **Ron Humbert** or **Jim Nesci** or both will follow up with a short program on "Reptiles and Amphibians in Ponds."

On February 25, **Gerry Salmon**, a herpetoculturist from Rhinebeck, New York, will speak on "A Visit to a Rattlesnake Den, with an Overview of Timber Rattlesnakes in New England."

We are required to use the entrance on the west side of the museum. **We are allowed to use the free parking lot to the west of the museum as long as space is available. Your best bet is to try that lot first before settling for the lot to the east of the museum or for the Soldier Field lot. For the latest on the parking situation call our CHS message line, (773) 281-1800, before you come.** Public transportation is an option: the Roosevelt Road (12th Street) bus now goes directly to the museum, thus providing a connection with the el and subway. This bus service runs until 11 P.M.

Turtle Club

The Chicago Turtle Club will meet Sunday, January 25, 1:00–3:30 P.M., at the North Park Village Administration Building, 5801 N. Pulaski, in Chicago.

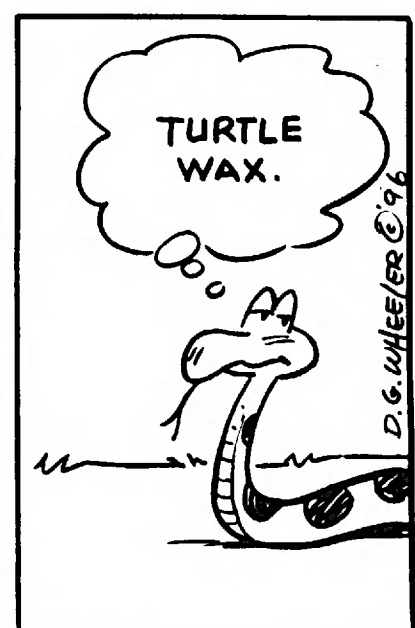
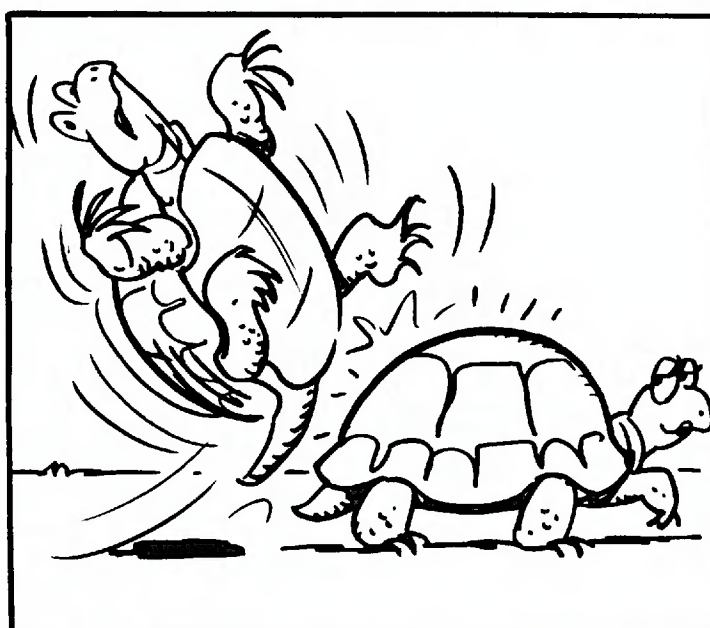
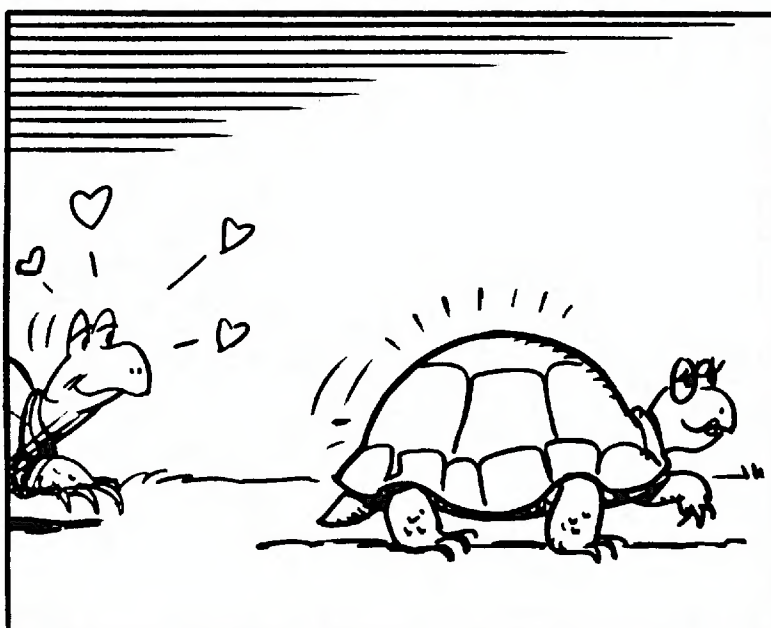
MIDWEST DECLINING AMPHIBIANS CONFERENCE

A Joint Meeting of the Great Lakes and Central Division Working Groups of the Declining Amphibian Populations Task Force will be held Friday and Saturday, March 20–21, 1998, at the Milwaukee Public Museum, 800 W. Wells Street, Milwaukee, Wisconsin. This two-day conference will focus on amphibian biology, malformities and conservation in the Midwest, encompassing the states of Minnesota, Wisconsin, Michigan, Iowa, Missouri, Illinois, Indiana, and Ohio. The deadline for submitting papers for this conference is February 20, 1998. Interested parties may register or submit papers through the conference web site: <<http://www.mpm.edu/collect/vertzo/herp/Daptf/Midwest.html>>. Those without web access can obtain details on paper sessions and registration from Gary S. Casper, Milwaukee Public Museum, 800 W. Wells Street, Milwaukee WI 53233, (414) 278-2766.

MOVING??

Please let us know in plenty of time of any change in your mailing address. The *Bulletin of the Chicago Herpetological Society* is sent to our U.S. members by bulk-rate third class mail. This means that the U.S. Post Office will not forward your *Bulletin* with the rest of your mail. This is so even if you make a special request that your magazines be forwarded (such a request only applies to second class mail).

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